




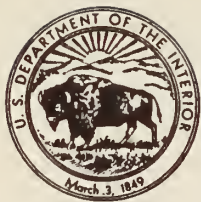
JACKSON LAKE REPLACEMENT STORAGE

A STUDY
FOR THE BUREAU OF RECLAMATION
BY THE NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR



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UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE



IN REPLY REFER TO:

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MIDWEST REGION
1709 Jackson Street
Omaha, Nebraska 68102

March 18, 1966

Memorandum

To: Regional Director, Bureau of Reclamation, Region 1
P.O. Box 937, Boise, Idaho 83701

From: Acting Assistant to the Regional Director, Cooperative
Activities and Public Affairs

Subject: National Park Service Reconnaissance Report of the
Recreation Aspects for providing Jackson Lake
Replacement Storage, Upper Snake River Basin,
Wyoming - Idaho

In accordance with the Department of the Interior's cooperative water development program, we are forwarding six copies of the subject report. Copies of the Recreation Statement for inclusion in your report have already been submitted. Other distribution is as noted in the attached list. Please advise us if you need additional copies and when distribution to other interested groups or persons is authorized.

This report reflects pertinent comments furnished by reviewing agencies. We appreciate the assistance provided by your agency and others in the preparation of this report.

Kenneth R. Krabbenhoft

Enclosure

Copy to:

- 3 Director, National Park Service, Washington, D. C.
- 1 Commissioner, Bureau of Reclamation, Washington, D. C.
- 1 Director, Bureau of Outdoor Recreation, Washington, D. C.
- 1 Regional Director, Bureau of Outdoor Recreation, Pacific Northwest Region, Seattle, Washington
- 5 Regional Forester, U.S. Forest Service, Inter-Mountain Region, Ogden, Utah
- 1 Regional Director, Bureau of Sport Fisheries and Wildlife, Pacific Region, Portland, Oregon
- 1 Regional Director, Bureau of Sport Fisheries and Wildlife, Southwest Region, Albuquerque, New Mexico
- 1 Area Supervisor, Bureau of Sport Fisheries and Wildlife, Boise, Idaho
- 2 Area Director, Bureau of Mines, Area VII, Albany, Oregon
- 2 Area Director, Bureau of Mines, Area V, Denver, Colorado
- 2 Area Director, Bureau of Indian Affairs, Area 9, Portland, Oregon
- 2 Area Director, Bureau of Indian Affairs, Area 4, Billings, Montana
- 1 U.S. Geological Survey Representative, Pacific Northwest Field Committee, Menlo Park, California
- 1 Area Administrator, Bureau of Land Management, Area 2, Salt Lake City, Utah
- 1 Area Administrator, Bureau of Land Management, Area 3, Denver, Colorado
- 2 State Director, Bureau of Land Management, Boise, Idaho
- 2 State Director, Bureau of Land Management, Cheyenne, Wyoming
- 2 Regional Engineer, Public Health Service, Region VIII, Denver, Colorado
- 1 Regional Coordinator, Pacific Northwest Region, Portland, Oregon
- 1 Area Engineer, Bureau of Reclamation, Snake River Development Office, Boise, Idaho
- 1 Governor, State of Idaho, Boise, Idaho
- 1 Governor, State of Wyoming, Cheyenne, Wyoming
- 1 State Parks Division, State Land Board, Boise, Idaho
- 1 State Park Director, Shoshoni, Wyoming
- 1 Director, Idaho Fish and Game Department, Boise, Idaho
- 1 Commissioner, Wyoming Game and Fish Commission, Cheyenne, Wyoming
- 1 Interstate Streams Commissioner, Cheyenne, Wyoming
- 1 Chief, Office of Cooperative Activities, National Park Service, Portland, Oregon
- 1 Regional Director, Western Region, National Park Service, San Francisco, California
- 1 Regional Director, Southwest Region, Santa Fe, New Mexico
- 1 Regional Director, Northeast Region, Philadelphia, Pennsylvania
- 1 Regional Director, Southeast Region, Richmond, Virginia

RECREATION RECONNAISSANCE REPORT

for

JACKSON LAKE REPLACEMENT STORAGE

Upper Snake River Basin
Wyoming - Idaho

March 1966

Prepared by
Cooperative Activities
National Park Service, Midwest Region
Department of the Interior

for

Bureau of Reclamation
Region 1
Boise, Idaho

Kenneth R. Krabbenhoft
Acting Assistant to the Regional Director
Cooperative Activities and Public Affairs

Report by
Randall R. Pope
Landscape Architect

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The majestic Tetons as viewed across Jackson Lake when nearly full.

RECONNAISSANCE REPORT ON THE RECREATION ASPECTS FOR PROVIDING JACKSON LAKE REPLACEMENT STORAGE

I. INTRODUCTION

This report represents an evaluation of the recreation potential of alternative water storage sites for the Jackson Lake Reservoir. Replacement storage possibilities include all the most favorable alternative storage sites on the main stem of the Snake River and tributary streams below Jackson Lake and in the Upper Snake River Basin above Milner Dam. The Bureau of Reclamation has requested the report for use in its generalized reconnaissance appraisal of storage possibilities which will identify the most promising plan for Jackson Lake replacement storage.

This report is prepared under the basic authority of the Park, Parkway and Recreational Area Study Act of June 1936 and is according to the April 5, 1955 Memorandum of Understanding between the Bureau of Reclamation and the National Park Service.

Since establishment of Grand Teton National Park and the addition of Jackson Lake to the Park in 1950, several studies have been made regarding the stabilization of Jackson Lake. This investigation and report was requested of the National Park Service by the Commissioner, Bureau of Reclamation, by copy of a memorandum dated May 9, 1962.

Current background preparation for this report includes discussions with Bureau of Reclamation, Bureau of Sports Fisheries and Wildlife, and U.S. Forest Service personnel, and a field study of the area in October 1963, with Reclamation representatives. During the course of the survey conferences were also held with officials of the above mentioned agencies and those representing the Corps of Engineers, Wyoming Game and Fish Commission, U.S. Bureau of Land Management, Teton County Commissioners (Wyoming), and the Izaak Walton League of America.

Previous reports relating to recreation aspects of unauthorized water control projects in the Upper Snake River Basin areas are as follows:

Alpine Dam and Reservoir, Snake Narrows Project, Upper Snake River, Wyoming, February 1959.

Crow Creek Reservoir, Upper Star Valley Project, Idaho-Wyoming, December 1947.

Project Report, Recreation Resources of the Proposed Crow Creek Reservoir, Upper Snake River Project, Upper Star Valley, Idaho-Wyoming, January 1965.

Palisades Reregulating Dam, Power Plant, and Reservoir of the Palisades Project, Idaho and Wyoming, December 1955. (Burns Creek Dam and Reservoir.)

Report on the Recreation Aspect of Bureau of Reclamation Water Control Proposals, Upper Snake River, Wyoming, May 1958.

Recreation Potentialities in relation to plans for development of Water Resources, Upper and Middle Snake River Basin, March 1960.

Preliminary Report on Stabilization of Jackson Lake Reservoir, Grand Teton National Park, March 1962.

This report is for United States Government use, and specific permission for its public release must be obtained from the Bureau of Reclamation.

II. SUMMARY

Findings:

The analysis of the recreation aspects of the alternate water storage sites for Jackson Lake Reservoir covered in this report is based on preliminary survey information as provided by the Bureau of Reclamation as of May 1965. Therefore, the analysis is limited in scope and subject to change as further planning develops.

Jackson Lake Reservoir lies within the boundaries of the present Grand Teton National Park in Wyoming. The Lake was enlarged by a Bureau of Reclamation dam, constructed in 1913-1916, and now forms a reservoir with 25,500 surface acres. The dam and reservoir was constructed for the single purpose of providing water storage for downstream irrigation.

Severe fluctuation that occurs in Jackson Lake water levels has been a subject of increasing concern over many years. Extreme drawdown conditions have resulted in unnatural lake features that have severely affected the high quality scenic and recreation values associated with Jackson Lake. Extreme water releases from the dam have resulted in additional losses to scenic and recreation values downstream.

Outstanding and unique scenic, recreation, scientific, and historical values and resources adjacent to Jackson Lake Reservoir make the need for its stabilization a matter of national interest and concern. Stabilization of Jackson Lake and the related downstream releases will require 640,000 acre-feet of water at another reservoir site or sites, except at American Falls where 725,000 acre-feet is required, to replace the 624,400 acre-feet of irrigation yield lost at Jackson Lake. Replacement storage possibilities include alternative storage sites on the main stem of the Snake River and tributary streams between Jackson Lake Dam and Milner Dam in Idaho. Ten potential storage sites, listed under Conclusions, have been given consideration for Jackson Lake replacement storage.

Conclusions:

It is concluded that the referenced storage sites would have the following effect upon recreation values.

Fremont and Ririe: Construction of the Fremont or Ririe Dams to provide replacement storage for Jackson Lake is not considered feasible. These sites are both small in storage capacity and are required for local flood control and irrigation purposes.

American Falls: Enlargement of the existing American Falls Reservoir is the subject of a separate report presently being prepared by the

National Park Service. This proposal offers an opportunity to provide the storage necessary to stabilize Jackson Lake.

Enlargement of the existing American Falls Reservoir would not affect the recreation use and value of the site as the present water surface is large enough to support all anticipated use.

In the interests of the National Park Service this proposal would be considered a very satisfactory replacement for the Jackson Lake storage.

Palisades: Enlargement of the existing Palisades Reservoir would not affect the recreation use and value of the site. Existing Forest Service recreation developments would have to be relocated.

The Bureau of Sport Fisheries and Wildlife estimates an increase in fishing use with the enlargement proposal if optimum development of facilities are included in the project.

Enlarging the Palisades Reservoir would result in one of the best storage replacement possibilities for the purpose of stabilizing Jackson Lake, and would have minimum adverse effects as compared to the following sites. This proposal would have the support of the National Park Service.

Lynn Crandall: Construction of the Lynn Crandall Reservoir would result in a gain of recreation values. There would be an increase in recreation use for camping, picnicking, boating and swimming with installation of the reservoir.

The Bureau of Sport Fisheries and Wildlife states this is the last remaining section of river for cutthroat trout fishing on the Snake in Idaho. The reservoir would flood big game habitat; however, mitigation measures are proposed and appear feasible to the Fish and Wildlife Service.

This proposal would be a suitable replacement feature from the viewpoint of the National Park Service.

Cottonwood: Construction of the Cottonwood Dam and reservoir could adversely affect downstream flows of the Gros Ventre River in Grand Teton National Park.

The reservoir site would inundate a high mountain valley which presently receives substantial recreation use that is primarily related to hunting and fishing. Important big game range habitat and an elk winter feeding ground site would be flooded. Installation of this dam would also block passage of cutthroat trout to spawning areas.

Because of the adverse conditions created by this proposal, the Service could not consider it to be a suitable replacement feature.

Elbow: Construction of the Elbow Dam and reservoir would inundate a high scenic mountain valley. The affected site is heavily used by hunters, fishermen and campers.

Installation of the Elbow Dam would result in a loss of recreation values, fish and wildlife values and esthetic values.

The adverse effects of this proposal would preclude it from being considered as a suitable replacement site.

Blackrock: Construction of the Blackrock Dam and the resulting reservoir could adversely affect downstream flows of the Buffalo Fork and Snake Rivers within Grand Teton National Park. It would also inundate a portion of the Teton Wilderness Area.

The Blackrock reservoir would flood a very scenic mountain valley with high recreation values; seriously affect an important migration route for elk; destroy valuable moose habitat; and block passage of cutthroat trout to upstream tributary spawning areas.

In the estimation of the National Park Service these adverse effects would preclude this site from being a suitable replacement feature.

Granite Creek: Construction of the Granite Creek Dam and reservoir would not have a direct impact on any areas administered by the National Park Service, nor on any designated wilderness areas. However, it would have extreme adverse effects upon an outstanding scenic section of the Hoback Canyon, which is a major approach route for recreationists to the Jackson Hole Region, Grand Teton and Yellowstone National Parks.

The Granite Creek Reservoir would flood an area of interesting geologic formations, many existing and potential recreation areas, and would be detrimental to wildlife and fishing values.

The adverse effects upon existing values would prevent this site from being considered a suitable replacement feature by the National Park Service.

Alpine: Construction of the Alpine Reservoir, previously known as the Snake Narrows Project, would have extremely adverse effects on the nationally important wildlife, fishing, and recreation values present in this portion of the Snake River Canyon. The Alpine site would destroy an interesting and pleasing approach from the west to the Jackson Hole area, Grand Teton and Yellowstone National Parks.

The Alpine Reservoir would flood a very scenic mountain valley with outstanding recreation values, destroy valuable elk habitat and winter feeding grounds, block cutthroat trout spawning areas,

seriously affect elk and deer migration routes, and destroy a free-flowing section of the Snake River that is and will continue to be more valuable for its natural recreation values than a highly fluctuating reservoir.

The high loss of existing values which would result from construction would prevent National Park Service support of this proposal as a replacement feature.

Suggested Administration of Proposed Reservoirs

On the individual projects where administration of recreation would most appropriately be by the Forest Service because the project falls within or adjacent to a National Forest, the cost of facilities and separable costs allocated to recreation shall be non-reimbursable. Lands on such projects not already a part of a National Forest should be afforded National Forest status for recreation and other National Forest system purposes. Since it is assumed that the proposed recreation developments would be administered under the terms of the 1948 Memorandum of Understanding between the Bureau of Reclamation and the Forest Service, (except at American Falls) estimates have not been included for recreation facilities, interim operation, or maintenance costs.

General

Even though upstream and on-site benefits have been evaluated for the Alpine, Granite Creek, Blackrock, Elbow, and Cottonwood sites, as shown on the following summary, it should not be construed in any way that the National Park Service lends support for these projects as alternate storage for Jackson Lake stabilization.

The Jackson Lake area is nationally significant. However, it is only part of the Jackson Hole region which is one of the finest recreation complexes in the country. The proposed dams would adversely affect the present scenic and natural qualities in this complex. The Service strongly recommends that Jackson Lake be stabilized without the use of these sites.

Recommendations:

1. Further study and consideration should be given to the Palisades and American Falls enlargement proposals as alternative storage sites for stabilizing Jackson Lake.
2. If neither enlargement proposal proves feasible, continue investigation of the Lynn Crandall Dam and reservoir.
3. The following proposed reservoir sites should not be given further consideration for the purpose of providing alternative water storage for stabilizing Jackson Lake: Alpine, Granite Creek, Blackrock, Elbow, and Cottonwood.
4. If the Bureau of Reclamation proceeds with further planning on these proposals, it is requested that the National Park Service be notified so that additional recreation planning in cooperation with the Forest Service as well as a historical survey and archeological field studies can be undertaken prior to construction.

III. JACKSON LAKE

A. General Description of the Area

Jackson Lake is near the headwaters of the Snake River in extreme northwestern Wyoming, in a valley known as Jackson Hole, which is almost entirely rimmed by mountains. Jackson Lake was formed during recent ice advances in the valley.

The original lake level, at elevation 6,730, had an area of approximately 17,700 water surface acres. A timber dam was constructed during the years 1905 to 1907 as a temporary structure across the outlet of the lake in an effort to impound water for irrigation purposes. Natural conditions of the lake and its shores were severely modified through construction of an irrigation dam which raised the water surface of the lake 39 feet. The dam was constructed by the Bureau of Reclamation in 1916 as part of the Minidoka Project, and is now operated by the Bureau under an agreement with the National Park Service. At full pool, elevation 6,769, Jackson Lake reservoir has an area of about 25,500 surface acres with a useable capacity of 847,000 acre feet of storage.

For visitors entering Grand Teton National Park from the north (via Yellowstone National Park) or from the northeast (via Buffalo Park entrance) Jackson Lake is the first major scenic feature other than the Teton Range itself. Jackson Lake Reservoir, when full, offers a very fine foreground setting for the Teton Range which is often reflected from the water surface. The reservoir area is looked upon

SUMMARY OF ESTIMATED ANNUAL NET RECREATION USE AND MONETARY BENEFITS

Reservoir Storage Site	Replacement Storage Acre-feet	Recreation Use		On-Site Benefits		Upstream Benefits	
		*Initial	*Optimum Dev.	*Initial	*Optimum	*Initial	*Optimum to Jackson Lake
American Falls	**725,000	Gain 56,000	126,000	Gain 50,400	113,400	Gain **1,183,000	2,350,800
Palisades	640,000	No Change		No Change		Gain 1,183,000	2,350,800
Lynn Crandall	640,000	Gain 68,200	281,700	Gain 58,900	243,270	Gain 1,183,000	2,350,800
Cottonwood	295,000	Gain 4,950	42,250	Gain 3,960	36,200	Gain 414,000	822,800
Elbow	345,000	Loss 4,650	14,740	Loss 13,960	44,160	Gain 508,700	1,010,800
Blackrock	354,000	Loss 2,000	4,850	Loss 6,020	14,560	Gain 520,500	1,034,300
Granite Creek	403,000	Loss 13,800	25,600	Loss 50,825	94,975	Gain 650,600	1,292,900
Alpine	640,000	Loss 2,000	10,500	Loss 135,000	274,700	Gain 1,183,000	2,350,800

*Initial-Optimum use period represents 25 years

**If less than full replacement storage, upstream benefits are reduced accordingly



Visitors entering Grand Teton National Park from the north stop for their first expansive view of the Grand Teton Range at Jackson Lake scenic turnout - 1961.

as a portion of the Park where opportunities for water-oriented recreation can be provided without as much sacrifice of Park values as would be involved in such use of the wholly natural piedmont lakes. Visitor use developments along the south and east shoreline of the lake have been provided to accommodate and serve the visiting public.

Approximately 2,000,000 people viewed Jackson Lake during the 1964 travel season. Recreation use of the lake area includes sightseeing and photography, water associated activities such as fishing, boating, swimming, water skiing, and sail boating. In addition to these uses, three developed campgrounds on the lakeshore receive extremely heavy use during the summer season. Other recreation activities pursued by many visitors include hiking or riding the lakeshore trails, picnicking, or just staying overnight in nearby accommodations.

According to the U.S. Bureau of Census report of 1960, the population of Teton County where Jackson Lake is located, is 3,062. This represents an increase of 18 per cent over 1950. The population of Jackson, Wyoming, Teton County Seat, is 1,437. There are approximately 7,000 persons living within one hour's driving distance and 78,000 within two hours' driving distance of Grand Teton National Park. As this is an area of National significance, the realm of influence extends far beyond the normal day use or weekend distances.

During the 1964 season 2,456,836 persons visited the Park with about 88 per cent of this total arriving during the four month period of June, July, August, and September. About three-fourths (1,850,000) of the 1964 total visitation occurred between June 15 and August 31. Projection of travel for Grand Teton National Park for 1972 is 2,900,000 visitors.

Nearly all Park visitors arrive by private autos. All-weather highways U.S. 187, 287, 26, and 89 provide access to Jackson Hole from south, east, and west. Entrance from the north via Yellowstone National Park may be made generally from May 1 through November 1.

Visitors can also come by air or bus. Daily commercial air service links the Jackson Hole Airport with Salt Lake City and Billings (year-round) and Denver (summer only). Commercial bus service is available during the summer between Jackson, Wyoming, and the nearest railroads at Victor, Idaho, and Rock Springs, Wyoming.

The climate of the Jackson Lake area during the recreation season is mild, with temperatures seldom reaching 90°, even during the warmest summer days--evenings can be quite cool. Average annual precipitation recorded at Moose, (Park Headquarters, 20 miles south of Jackson Lake) is 25 inches, with most of it falling in the form of snow during late November through early March. Snowfall averages 223 inches annually. Frost may occur any month of the year. Prevailing winds are from the southwest throughout the year.

The economy of Jackson Hole was at one time primarily dependent upon ranching and limited agricultural activities and mining ventures. Tourism has expanded rapidly in recent years and has become a major element in local economy. National Forests, the Wildlife Refuge, Yellowstone and Grand Teton National Parks, contribute materially to the increase in recreational interest and use within and near Jackson Hole.

B. Effects of Jackson Lake Drawdown

Jackson Lake dam and reservoir was constructed for the single purpose of providing an irrigation water supply for lands located downstream in Idaho. In effect, the irrigators own the upper 39 feet of water and Jackson Lake dam so that when water is required for downstream needs it must be released.

Extreme fluctuation that periodically occurs in Jackson Lake water levels has been a subject of increasing concern. Since completion of the project in 1916, water storage has been completely withdrawn during six of the operating years or on an average of once in about every eight years. In addition to the complete drawdown years, water storage releases with resulting artificial or unnatural shorelines have occurred every year of operation during the main visitor season (June 15 to August 31) to some degree.

Severe lake fluctuation was brought into sharp focus in 1961. Jackson Lake elevation at the end of March 1961 was about 32 feet below full pool. Water was stored in the lake until June 19, when it reached maximum level for that year at about 6,756 or 13 feet below full pool level. Drawdown started immediately. On August 7 the reservoir was 34 feet below full and all available storage water had been drafted by August 18 to 39 feet below full pool.

These extreme fluctuations which create unnatural lake features have extremely adverse effect on high quality Park experience for all available kinds of general and specialized recreation activities. The equally important intangible esthetic and inspirational values are also involved. The quality of the visitors' park and recreation experience is greatly affected by lake conditions.

Operation of the Colter Bay Marina is affected at elevation 6,759 and lower by hampering the largest boating craft and is completely inoperative at elevation 6,754 or 15 feet below full. Temporary launching sites with aircraft landing mats can be provided for access to the water across mud flats but this also creates undesirable intrusions. Concessions with boat launching facilities encounter difficulties to accommodate this activity when the lake level begins to fluctuate drastically or drops much below 6,760. In addition to the esthetic values involved and the water access problems, there is also a loss of surface acres for boating. At full pool the water surface area is about 25,500 acres and 17,700 acres when completely drawn down.

This constitutes a loss of 7,800 acres or over 12 square miles. Most of these 7,800 acres are mud flats with some of it being rocky shores. It is estimated that a loss of about 19,600 visitor boating days occurred in 1961. This includes concessioner scenic boat trips.

Whether camping, horseback riding, hiking, or participating in a conducted interpretive walk along Jackson Lake, the foreground view with acres of mud flats is unsightly and disturbing. Use of the islands and shorelines accessible only by boat for purposes of camping, hiking, picnicking, and related activities dropped some 33 percent in 1961 from that in 1960. This recreation use dropped even though total Park visitation increased nearly 5 percent in 1961.

Although water temperatures of Jackson Lake are quite cool, swimming at the Colter Bay beach is a popular visitor attraction. Decrease in swimming use attributed to low water conditions occurred only in 1961 during the past five years. Apparently partial drawdown to as low as 6,760 does not materially affect swimming. It is estimated that some 6,000 swimming activity days were lost during the severe drawdown conditions in 1961.

Exceptionally high or low volume of water releases from Jackson Lake dam affect downstream conditions of the Snake River and can be detrimental. Fishing, float trips, nesting waterfowl, Menor's Ferry operation, and the biotic conditions of the Snake River are adversely affected by unseasonal water releases.

A study is currently being made to evaluate the effects of water flow patterns and volumes on the aquatic life in the Snake River. It will probably take several years of investigation prior to making more specific recommendations on release patterns that would be most compatible with attempts to maintain a native wild cutthroat fishery and preserve the scenic values of aquatic environments.

The operating replica of the historic Menor's Ferry on the Snake River near Moose is part of the National Park Service's interpretive program. During each of the past four years, 1961-1964, high water in spring and low water in fall have affected the safe operation of the ferry. The average operating season was limited to the period of July 10 through August 18, whereas the visitor season is considered to be June 15 through August 31. It is estimated that an average annual loss of 5,000 activity days occurred over the past four years through inoperability of the ferry because of stream conditions.

A float trip down the Snake River is a wilderness type experience enjoyed by many Park visitors. Concession operated or individuals with their own rafts utilize the 30 miles of Snake River in the Park as well as that below the Park boundary when water conditions permit. Approximately 900 to 1,000 river float trip activity days are lost each year because of extreme water releases.

Stabilized water releases from the reservoir will permit reasonably successful float trips, operation of Menor's Ferry, and optimize stream fishing.

C. Stabilization of Jackson Lake

Outstanding and unique scenic, recreation, scientific, and historical values and resources adjacent to Jackson Lake Reservoir made the need of its stabilization a matter of National interest and concern.

Alternate possibilities for stabilizing the water level in Jackson Lake have been analyzed. The following plan of operation is proposed for control of water which would permit stabilization of Jackson Lake.

1. Stabilize the water surface between elevations 6,769 and 6,765 during the heavy visitor use season - June 15 through August 31.
2. September drawdown not to exceed elevation 6,760 (nine feet from full pool).
3. Maintain constant level near 6,760 from October through January to enhance Mackinaw Trout spawning.
4. Flood control operation February through May with drawdown normally not exceeding 12 feet or to elevation 6,757, which will provide 300,000 acre feet for flood control storage.
5. Refill by June 15 to elevation 6,769 or to 6,765.
6. Stabilize downstream Snake River flows by controlled releases at Jackson Lake Dam coordinated with natural flows of Buffalo Fork River and Pacific Creek. Average releases for June, July, and August should be near 2,500 c.s.f., coordinated with flows in Buffalo Fork and Pacific Creek to provide approximately 4,100 c.s.f. downstream. Fall and winter releases should not be less than natural inflows.

Compromises of numbers 4 and 6 will become necessary under particular situations. With above normal snowfall and precipitation, additional storage space may be necessary to prevent downstream flooding. When the inflow drops below the suggested outflow, adjustments of downstream releases and the recommended lake level will become necessary. Maintaining minimum fall and winter (October through March) Snake River flows for aquatic life should take precedence over maintaining optimum midsummer flows for river float trips or operation of Menor's Ferry. If these conditions occur, the solution should be mutually agreed to by the Bureau of Reclamation and the National Park Service.

This desired plan of water control would produce the following results:

1. A minimum of lake fluctuation would occur during the heavy visitor season, which would benefit all general and specialized recreation pursuits in the Jackson Lake vicinity.
2. Unnatural shorelines with exposed mud flats and tree stumps would not be visible until after January and would again be covered prior to the visitor season.
3. Colter Bay Marina and other boating access facilities would be operable under near optimum water conditions.
4. Necessary flood control storage would be available to minimize possible flood damage downstream on the Snake River.
5. Aquatic life in the Snake River will be sustained by maintaining fall and winter releases.
6. Stabilized Snake River releases during the visitor use season would enhance float trips, operation of Menor's Ferry, and stream fishing.

Stabilization of Jackson Lake at water levels outlined above with the necessary downstream releases will require replacement storage of water in lieu of that in Jackson Lake now allocated to irrigation purposes. Approximately 624,400 acre-feet of alternate water storage would be required to stabilize Jackson Lake to the desired levels of operation. However, because of other factors affecting storage at the various alternate sites, such as evaporation, etc., the Bureau of Reclamation has stated that an average 640,000 acre-feet of replacement water storage will be required for stabilization purposes, except at American Falls where 725,000 acre-feet will be needed.

D. Upstream Benefits Resulting from Stabilization of Jackson Lake

General Use	Existing Use	Increased Use Increment by		Total Increased Use	Total Use
		(1972)	(2000)		
Recreation Days (sight-seeing, camping, swimming, boating)	2,366,040	736,458	729,166	1,465,625	3,831,666
Increased Benefit as result of stabilizing Jackson Lake (Recreation Day Value)	0.50	0.50	0.50	0.50	0.50
Monetary Benefit (Rounded)	1,183,000	368,200	364,600	732,800	1,915,800



Historic Menor's Ferry operating on the Snake River below Jackson Lake Dam with good water conditions.

Specialized Uses

*Total Activity Days (Snake River float trips, Menor's Ferry)	20,000	25,000	52,000	77,000	97,000
Recreation Day Value (Average)	**0	5.40	5.70	5.65	
Total Monetary Benefit	**0	135,000	300,000	435,000	

*Value for specialized Uses based on \$15/day for float trip and \$3/day for Menor's Ferry

**No change in value of existing use

Recapitulation

Benefits derived from existing use with stabilization	1,183,000	
Benefits from increased use by 1972	<u>503,200</u>	
Total benefits by 1972		1,686,200
Incremental benefits (2000)		<u>664,600</u>
Optimum benefits (2000)		2,350,800

No attempt has been made to place a value on a visit to Grand Teton National Park. However, an additional benefit of \$0.50 per general recreation day to both existing and increased use has been assigned.

The above tabulation would be attributed to specific replacement storage project. When less than total replacement storage is available, the benefits attributed to the project are adjusted accordingly.

Upstream benefits for Jackson Lake are computed on a scale whereby the upper level of replacement is the most valuable. Combined storage at two or more reservoir sites providing total replacement would therefore result in full benefits.

IV. ANALYSIS OF SPECIFIC PROJECTS FOR REPLACEMENT STORAGE

To provide the required replacement storage for stabilizing Jackson Lake, an impoundment at an alternate reservoir site becomes necessary. The water supply source now stored at Jackson Lake would then be transferred as required to the alternate site(s). The scope of this study includes those alternate water storage potentials in the Upper Snake River Basin above Milner Dam as designated by the Bureau of Reclamation.

The primary purpose of this investigation is to provide stabilization of Jackson Lake. However, in establishing alternate water storage facilities to accomplish this, other secondary benefits or losses will accrue at the various specific sites. But those benefits of primary concern and in luncence are those related to upstream benefits in Grand Teton National Park.

Each of the potential replacement storage sites is treated as a specific project in the following recreation analysis.

A. FREMONT DAM AND RESERVOIR

The authorized Fremont Reservoir, located on the Teton River in Fremont and Madison Counties, Idaho, was suggested as an alternate storage site for Jackson Lake. The Bureau of Reclamation reports that for geographic and topographic reasons, the storage at this site provides the only water supply possibility from an engineering and physical viewpoint to meet pressing supplemental water needs of some 114,000 acres in the Fremont-Madison Irrigation District. Also, the future irrigation of up to 37,000 acres of new lands would depend upon direct diversions from Fremont Reservoir. Thus, it was concluded that there are several important physical and water resource utilization factors which would make the use of Fremont storage for this purpose ("in lieu" storage for Jackson Lake) impossible.

Therefore, the Fremont site has been dropped from further consideration for Jackson Lake replacement storage.

B. RIRIE DAM AND RESERVOIR

Ririe Reservoir is an authorized multiple-purpose storage development on Willow Creek in Bonneville County, Idaho. This reservoir was also suggested as an alternate possibility for partial replacement for Jackson Lake replacement storage.

Storage potential of the Ririe site is small in comparison to the Jackson Lake replacement need. The active capacity is limited because of the flood control requirements for protection of urban and agricultural areas east of Idaho Falls.

The Bureau of Reclamation advised the Ririe site was not to be given further consideration as "in lieu" storage for Jackson Lake.

C. AMERICAN FALLS RESERVOIR ENLARGEMENT

The existing American Falls Reservoir is located on the Snake River near American Falls, Idaho. Construction of the project was completed in 1927. The reservoir has a capacity of 1,700,000 acre-feet and a surface area of about 56,000 acres.

The Bureau of Reclamation now has studies underway which consider alternate enlargement capacities. Reservoir sizes under consideration are 2,440,000 acre-feet and 2,990,000 acre-feet of storage. It is physically possible to raise the American Falls Dam and Reservoir to provide full replacement needs to stabilize Jackson Lake. However, in providing full replacement needs at American Falls, it might require a change in operation of Palisades Reservoir to meet requirements at delivery points which lie upstream from American Falls Reservoir, plus associated complicating factors.

The proposed American Falls Reservoir enlargement is at this time the subject of a separate Project Report being prepared by the Park Service. Upstream benefits accruing to the enlargement proposal relate to the "in lieu" storage for Jackson Lake with resulting improved water levels and downstream flows. The existing American Falls Reservoir is capable of supporting all of the recreation use which can reasonably be expected to develop in this area. Therefore, an increase in size of the water surface would not increase the recreation potential.

However, as recreation facilities are lacking, it is assumed that public recreation use will increase with installation of basic recreation facilities. The cost of recreation facilities should be included as part of the project costs.

<u>Initial Development</u>		<u>Annual Visitor Days</u>
Existing Use		24,000
Initial Use (added)		<u>56,000</u>
Total		80,000
 <u>Annual Monetary Benefits</u>		
Existing Use	@ \$0.90	\$21,600
Initial Use	@ \$0.90	<u>50,400</u>
Total		\$72,000
 <u>Costs</u>		
Construction (including \$80,000 replacement cost)		\$338,000
Land		18,000
Annual O&M		19,000
Amortization		19,200
Total Annual Cost		\$38,200
Rounded		\$38,000

Optimum DevelopmentAnnual Visitor Days

Additional Use		70,000
Monetary Benefits	@ \$0.90	\$63,000

Costs

Construction	\$283,000
Annual O&M	15,490
Amortization (annual)	16,479

Total Annual Cost	\$31,969
Rounded	\$32,000

It appears that this proposal could provide full replacement storage for Jackson Lake. Of the reservoir sites presently under study by the Bureau, the American Falls enlargement would result in one of the best possibilities for replacement storage, when recreation factors are considered. It is recommended that careful consideration be given the findings of the report on American Falls Reservoir as they relate to providing alternate water storage for stabilizing Jackson Lake.

D. PALISADES RESERVOIR ENLARGEMENTProject Data

The Palisades Reservoir and proposed enlargement is for the most part located within Targhee, Caribou, and Bridger National Forests. The existing damsite on the Snake River is in Sec. 17, T. 1 S., R. 45 E., Boise Meridian, Bonneville County, Idaho. Enlargement would require construction of a higher dam or enlarging the existing dam.

The proposed enlargement and resulting increased reservoir capacity would serve as full replacement storage for Jackson Lake, additional irrigation, power production, flood control, and recreation and fish and wildlife. Extreme fluctuation down to the minimum water surface level at elevation 5,529 is a 141-foot vertical drawdown.

Reservoir Data

<u>Storage</u>	<u>Top of Pool Elevation</u>	<u>Surface Acres</u>	<u>Capacity Acre-feet</u>
<u>Existing Reservoir</u>			
Maximum Water Surface	5,620	16,150	1,400,000
Inactive	5,498	4,974	200,000
<u>Proposed Enlargement</u>			
Maximum Water Surface	5,670	21,200	2,330,000
Inactive	5,529	7,185	390,000

The existing reservoir is approximately 17 miles long with an average width of about 2 miles. An increase of 50 feet in the maximum water surface would extend the existing reservoir pool up the Salt River another 4 miles and up the Snake River about 3 miles, but confined to the narrow canyon. Terrain surrounding the lake is quite steep, therefore, the width would not be appreciably increased.

General Description of the Area

The Palisades Dam is located on the Snake River about 14 miles downstream from the Idaho-Wyoming boundary. The reservoir pool extends about 3 miles into Wyoming.

Access to the reservoir is provided by U.S. Highway 26, which follows the entire length of shoreline along the northeast side. Forest Service access roads serve the southwest shore from the dam to the Bear Creek Arm of the reservoir, and again from Jensen Creek to the extreme upper limits of the reservoir where the Forest Service road connects with U.S. Highway 89.

Palisades Reservoir inundates the valley between the Caribou Mountains to the southwest and the Snake River Range to the northeast. The surrounding steep canyon walls are timber covered. Predominant trees are lodgepole pine, Douglas fir, Englemann spruce, and some aspen. The upper reaches of the reservoir are quite flat near the Alpine Highway Junction, where the reservoir widens out to nearly 3 miles.

Local economic, transportation, and climatic conditions affecting the site are generally similar in nature to those of the proposed Alpine Dam site just upstream from the Palisades Reservoir. It is anticipated that recreation influence of an enlarged Palisades Reservoir would not affect or alter the present recreation importance of the existing reservoir.

Recreation Areas in the Vicinity

National Parks, Forests, reservoirs, lakes and other recreation developments affecting the Palisades Reservoir are similar to those listed under the Alpine section of this report. However, it is anticipated that the proposed enlarged reservoir would not alter recreation influences of, or affect the existing Palisades Reservoir.

Effects of the Project on Existing and Potential Recreation Resources

The present esthetic qualities of the Palisades Reservoir would not materially be changed by the proposed enlargement. The existing reservoir has a very fine scenic setting. However, extreme water fluctuation does and would continue to detract from the scenic quality and recreation potential of the reservoir. The extent of exposed mud flats would be about the same as at present, but moved farther upstream.

The proposed increase of 50 feet in height of Palisades Reservoir would inundate about 2,625 acres of National Forest lands. It appears that five Forest campgrounds containing 129 sites are within the project area. There are also six boat ramps, two group camps (YMCA and Idaho Extension Service), and three resorts that would be affected by the proposed enlargement. The Forest Service has also designated the following potential recreation sites that would be eliminated by the enlargement: 22 campsites, 9 boating sites and 2 resort sites. Alternate or replacement recreation sites surrounding the higher reservoir pool are considered to be of lower quality. There is insufficient data available to determine the extent of highway (U.S. 26) relocation that would be necessary. This will largely determine the accessibility of suitable recreation sites.

Enlargement of the reservoir would eliminate about 10 miles of stream fishing. The Bureau of Sport Fisheries and Wildlife estimates an annual loss of 5,000 fisherman days in the reservoir area with the enlargement proposal and no additional facilities provided.

Present recreation use and value of Palisades Reservoir would not be materially affected by the proposed enlargement. It is anticipated that the larger reservoir would not have any increased influence or value for recreation use but would continue to support the outdoor and water-oriented activities present at the existing reservoir.

Recreation Development

Existing recreation facilities would require relocation or replacement to accommodate the requirements of the visiting public and provide for their initial enjoyment and safety and to protect the project. This includes the present 129 family camping-picnicking units, 6 boat ramps and related parking areas, 2 organized group camps, 3 resorts, drinking water and sanitary facilities, access and interior roads.

Installation of these recreation facilities are considered to be a non-reimbursable Federal responsibility.

Estimated Monetary Benefits

The following estimated monetary benefits accruing from the Federally developed recreation facilities for the Palisades Unit follow the guidelines established by the "Evaluation Standards for Primary Outdoor Recreation Benefits", Supplement No. 1, dated June 4, 1964.

General project recreation activities include swimming, picnicking, sightseeing, camping, and boating. Specialized project recreation activities related to upstream benefits include Snake River float trips and use of the historic Menor's Ferry.

Recreation use and related benefits attributed to the enlargement of Palisades Reservoir are not expected to affect existing recreation

attendance and the related value. Therefore, monetary benefits directly related to the Palisades Project would not be derived or lost from the proposed enlargement.

The capacity of the Palisades Enlargement Project could furnish total replacement storage for Jackson Lake. Annual upstream benefits are estimated on the basis that the recommended water levels in Jackson Lake and downstream regulation flow would result from the enlarged Palisades proposal.

<u>Replacement Storage</u>	<u>Upstream Benefits</u>		
	<u>Initial</u>	<u>1972</u>	<u>Ultimate</u>
640,000 Acre-Feet	\$1,183,000	\$1,686,200	\$2,350,800

Conclusions and Recommendations

The existing Palisades Reservoir could support the total recreation use that might be expected in this area. Therefore, an enlarged reservoir would not increase the recreation value of the site.

However, the enlarged reservoir could supply replacement storage necessary to stabilize Jackson Lake. Present recreation use and value would not appear to be greatly affected by an enlargement, although several fine Forest Service recreation developments would require relocation.

In summary, from a recreation standpoint and degree of adverse effects, it appears that of the dams and reservoirs presently under study by the Bureau, the Palisades Enlargement offers one of the best possibilities for replacement storage needed to stabilize Jackson Lake.

It is recommended that further study and consideration be given to the Palisades Enlargement proposal as an alternate water storage site for stabilizing Jackson Lake.

E. LYNN CRANDALL DAM AND RESERVOIR

Project Data

The Lynn Crandall Reservoir site is located on the Snake River, about 30 river miles downstream from the Palisades Dam. The dam site is in Sections 10 and 15, T. 3 N., R. 42 E., Boise Meridian, Bonneville County, Idaho.

Functions of the reservoir would be replacement storage for Jackson Lake, additional irrigation, power production, flood control, recreation, and fish and wildlife. Maximum drawdown to 129 feet to the inactive pool elevation of 5,246 would provide an active storage



Surplus landing-field mat being utilized as an improvised boat ramp - 1961.

capacity of 1,290,000 acre-feet. The Lynn Crandall Project could provide all of the alternate water storage capacity required to stabilize Jackson Lake.

Reservoir Data

<u>Storage</u>	<u>Top of Elevation</u>	<u>Surface Acres</u>	<u>Capacity Acre-feet</u>
Maximum water surface	5,375	16,700	1,460,000
Inactive	5,246	3,600	170,000

The dam would be approximately 291 feet high and about 2,000 feet long at crest. At full pool the reservoir would be approximately 30 miles long and varying in width from less than 0.3 mile where it is confined in the canyon to about 2.7 miles where it floods Swan Valley.

General Description of the Area

The reservoir would be confined to the narrow canyon of the Snake River Gorge until it reaches Conant Valley, 10 miles upstream of the dam site. The reservoir would then widen out to over a mile in Conant Valley, then narrow down for about two miles in the river canyon and then widen out again into the much larger Swan Valley.

Swan Valley would be flooded, forming the upper part of the reservoir and averaging nearly two miles wide for a length of almost eight miles. Palisades Dam is at the head or upper end of Swan Valley.

Along the northeastern edge of the canyon from the dam site to Dry Canyon in Targhee National Forest, the land rises abruptly from the Snake River. Farther upstream, Pine Creek Bench and Swan Valley lie to the northeast of the river. On the opposite side of the Snake River and to the southwest of the dam site, Antelope Flat, a rolling benchland, borders the canyon. Upstream from Conant Valley the Caribou National Forest adjoins the river.

The river bottom lands in the reservoir area have large groves of Cottonwood trees. Vegetation on the lower hillsides is primarily sagebrush, grass mixtures, bitterbrush, with some juniper and aspen. Stands of Douglas fir are also growing within the impoundment area. Conant and Swan Valley's cultivated lands are primarily devoted to hay and grain crops.

The climate of the Lynn Crandall Reservoir area is generally mild during the recreation season. Annual precipitation is about 15 inches. The average annual snowfall is about 63 inches. Daytime temperatures occasionally range to 100 degrees but the average maximum is around 78 degrees.

U.S. Highway 26 passes through the upper portion of the project area, including Conant and Swan Valley. This is one of the major access routes to Jackson Hole from the west. The highway crosses Antelope Flat about 3½ miles southwest of the dam site. Ririe and Victor are about 20 miles from the reservoir site; both are terminal points for a branch line of the Union Pacific Railroad.

The primary local recreation importance of the Lynn Crandall Reservoir is considered to be that of Bonneville, Madison, Teton, and part of Bingham Counties in Idaho, and portions of Lincoln and Teton Counties in Wyoming. According to the 1960 U.S. Bureau of Census Report, this area had a total population of about 69,900. Bonneville County showed an increase of nearly 56 percent over 1950, and approximately 71 percent of the residents are classified as urban. Access, physical barrier, and areas offering similar recreation opportunities affect the local recreation zone of influence. Idaho Falls, Idaho, (1960 population 33,161) is the nearest community in the area and only 38 road miles to the west of the reservoir site. Other towns in the vicinity include Rexburg (1960 population 4,767) which is 45 miles to the northwest; St. Anthony (1960 population 2,700) nearly 60 miles to the northwest; Blackfoot (1960 population 7,378) about 70 road miles to the southwest; and Pocatello (1960 population 28,534) about 90 miles to the southwest.

Bonneville County's employed labor force in 1960 totaled 17,059, of which 1,698 were engaged in agriculture, 2,443 in manufacturing, and the remainder in other industries. Median family income averaged as follows for the Idaho counties: Bonneville, \$6,446; Teton, \$4,105; Madison, \$5,470. Residents in Bonneville County had the highest median family income for the State of Idaho. It is expected the present economic and social characteristics will continue along current trends.

Recreation Areas in the Vicinity

The Lynn Crandall project site is about 50 and 100 road miles respectively from the south boundaries of Grand Teton and Yellowstone National Parks. There are nine Forest Service campgrounds containing 165 family units within a 25-mile radius of the project site. These campgrounds are in the Caribou and Targhee National Forests where other forms of recreation activities such as hiking, hunting, fishing, boating, etc., are available.

The following list of lakes and reservoirs in the general vicinity of the Lynn Crandall reservoir offer water-oriented recreation activities. Their recreation development and potential would affect the zone of influence around the project site.

Distance in the table refers to the approximate air miles and direction from the Lynn Crandall reservoir site; administering agency refers to the recreation facilities.

<u>Lake or Reservoir</u>	<u>Distance</u>	<u>Surface Acres</u>	<u>Administering Agency</u>
Palisades Reservoir	1 SE	16,150	FS
American Falls Reservoir	80 SW	56,000	Idaho Land Comm.
Jackson Lake Reservoir	45 NE	25,700	NPS
Lewis Lake	70 NE	2,750	NPS
Yellowstone Lake	80 NE	87,400	NPS

In addition to those water bodies listed above, Grays Lake and Blackfoot River Reservoir are about 25 and 40 miles respectively to the south. Both offer fishing opportunities. Island Park Reservoir is approximately 70 air miles to the north and also offers water-oriented recreation.

In the Parks for America publication, the Kelly Mountain area, 8 miles downstream from the dam site was suggested as a potential state recreation area. The St. Anthony Dunes area, located about 50 air miles to the northwest, was listed as a potential state park.

Effects of the Project on Existing and Potential Recreation Resources

Recreation use of this reservoir site is now primarily oriented toward hunting and fishing. The only public recreation facilities in the area are provided by the Forest Service. There are two developed campgrounds in the project area, Spring Creek and Falls, containing 62 family units. The Forest Service has designated 12 potential recreation sites in the impoundment area and estimates that 450 family camp units will be needed by 1976. With the project installed, they estimate a demand for 585 family camping units.

A privately owned lodge is located within the impoundment area. Of the 16,700 acres to be inundated, approximately 2,830 acres are National Forest lands, with the remainder in private ownership.

There is the possibility of a 129 foot fluctuation at certain times of the year, which would detract from the scenic quality and recreation potential of the reservoir. It appears that at inactive pool elevation, in Swan Valley only the original streambed would contain water. Generally, everything upstream from Conant Valley in the reservoir area would be exposed mud flats.

It is not known what the realignment of U.S. Highway 26 would be if the Lynn Crandall Reservoir were to be constructed. Highway proximity to the Swan Valley area and frequency of drawdown with resulting mud flats would affect the esthetics as it relates to the tourist traveler and the recreation potential of the reservoir.

However, construction of the Lynn Crandall Reservoir would result in a net gain to recreation use. It is anticipated there would be an

increase in boating, camping, picnicking, and other water activities such as swimming and water skiing. Early and late summer use would be mainly local with considerable out-of-state or tourist-in-route users in June, July, and August. With installation of basic recreation facilities, it is estimated that initial attendance would total 161,200 visitor days. This represents an increase of nearly 68,200 visitor days of general recreation use through construction of the project.

This portion of the Snake River and its tributaries, about 32 miles of streams to be inundated, support an excellent trout fishery. The Bureau of Sport Fisheries and Wildlife estimates an overall annual loss of 20,000 fisherman days in the reservoir area with installation of the project. This is the last of cutthroat trout fisheries on the Snake River in Idaho, according to the Fish and Wildlife Service.

The area is also popular with hunters. Deer use the impoundment area for summer and winter range. Some elk also utilize the project site for winter forage. The Bureau of Sport Fisheries and Wildlife estimates an annual loss of about 8,000 big game hunting activity days if the project is constructed. However, mitigation measures for this loss are recommended by the Fish and Wildlife Service.

Idaho State College, under contract with the National Park Service, surveyed the earlier proposal for the Burns Creek Reservoir area in 1958. Eleven Indian sites were located and recorded. Of these, five are considered of sufficient importance to merit two summers' archeological work on them at an estimated cost of about \$24,000. If the larger proposal or Lynn Grandall Project is authorized, additional surveys should be accomplished to include those areas not previously studied.

Recreation Development

Recreation developments recommended for installation at the Lynn Grandall Reservoir site would include replacement of existing facilities and in addition, those required to accommodate the needs of the visiting public and to provide for their initial enjoyment and safety. These facilities would include: surfaced interior roads, parking areas, picnicking and camping units, drinking water and sanitary facilities, and boating facilities such as ramps and docks.

Estimated costs of recreation facilities to be included as part of the project cost on Forest Service lands are shown in the Forest Service report.

Estimated Monetary Benefits

The estimated increase in recreation attendance resulting from the formation of this reservoir and the installation of the recommended

public use facilities follow the guidelines established by the "Evaluation Standards for Primary Outdoor Recreation Benefits", Supplement No. 1, dated June 4, 1964. Estimates do not include benefits attributed to hunting or fishing. General recreation includes such activities as sightseeing, picnicking, boating, swimming, skiing, camping, and use of trails by hiking or riding.

Recreation use and related benefits are estimated as follows:

<u>Initial Development</u>	<u>Visitor Days</u>
Use without project	93,000
Initial use with project	<u>161,200</u>
Gain	68,200

Benefits

Use without project	\$1.10	\$102,300
Initial use with project	\$1.00	<u>161,200</u>
Gain or increase		\$ 58,900

<u>Optimum Development</u>	<u>Visitor Days</u>
Projection without project	384,300
Ultimate use projection with project	<u>666,000</u>
Gain or increase	281,700

Benefits

Projection without project	\$1.10	\$422,730
Ultimate use projection with project	\$1.00	<u>666,000</u>
Gain		\$243,270

In unit values selected for the general recreation use, adjustments reflect quality consideration of the proposed reservoir and the mud flat conditions as compared to present conditions.

Annual upstream benefits are estimated on the basis that the Lynn Grandall Reservoir Project could furnish replacement storage for Jackson Lake, and that recommended water levels in Jackson Lake and downstream flow regulation would result from the installation of this project.



Stumps and stagnant water at Moran Bay greet the visitor on scenic boat trips during extreme drawdown conditions - 1961.

<u>Replacement Storage</u>	<u>Upstream Benefits</u>		
	<u>Initial</u>	<u>1972</u>	<u>Ultimate</u>
640,000 acre-feet	\$1,183,000	\$1,686,200	\$2,350,800

Conclusions and Recommendations

Construction of this project would result in a net gain as far as recreation is concerned. It is anticipated that there would be an increase in recreation use for camping, picnicking, boating, and swimming at the reservoir site. Fluctuation of this reservoir and the resulting large mud flats would detract from its recreation value. The reservoir would inundate good agricultural land and flood the town and the area known as Swan Valley. Substantial upstream benefits would accrue to the Lynn Crandall Reservoir proposal through replacement storage for Jackson Lake. The "in lieu" storage would stabilize Jackson Lake water levels and regulate downstream flows, and would enhance an area of national significance.

Therefore, it is recommended that further study and consideration be given to the Lynn Crandall Reservoir proposal as an alternate water storage site for stabilizing Jackson Lake.

F. COTTONWOOD DAM AND RESERVOIR

Project Data

The Cottonwood Reservoir site is located within the Teton National Forest boundaries on the Gros Ventre River. The dam site is in Section 2, T. 41 N., R. 112 W., and Section 35, T. 42 N., R. 112 W., 6th P.M., Teton County, Wyoming.

The reservoir would be operated for irrigation purposes as partial replacement storage for Jackson Lake and flood control along the Gros Ventre and Snake Rivers in Jackson Hole. A power plant is being considered, and functions would also include recreation and fish and wildlife. This reservoir, as other sites in this mountainous region, would usually fill during spring runoff. Maximum drawdown of 115 feet to minimum pool elevation of 7,465 would provide an active storage capacity of 295,000 acre-feet. The Cottonwood Reservoir would provide alternate storage capacity for approximately 46 per cent of that required to stabilize Jackson Lake.

Reservoir Data

<u>Storage</u>	<u>Top of Elevation</u>	<u>Surface Acres</u>	<u>Capacity Acre-feet</u>
Maximum water surface	7,580	4,225	335,000
Inactive	7,465	1,250	40,000

The dam would be an earth-fill structure nearly 200 feet high. At full pool the reservoir would be approximately $6\frac{1}{2}$ miles long and about $1\frac{1}{2}$ miles across at the widest point.

General Description of the Area

The Cottonwood Reservoir site is nearly 18 miles east of the eastern boundary of Grand Teton National Park. Access to this isolated, high, mountain valley is over nearly 26 miles of surfaced and dirt road from the Jackson Hole Highway (U.S. 26, 89, and 187). Approximately 6 miles are surfaced, 4 miles under construction in the Forest, and 2 miles in the Park planned for improvement during 1965. This still leaves some 14 miles of unimproved or graded road to the site. Future access to this valley from the east over Union Pass is anticipated by the Forest Service which would probably enter the reservoir area via the south fork of Fish Creek.

The Cottonwood Reservoir would flood a scenic valley which widens just above the dam site where Cottonwood and Fish Creeks join the Gros Ventre River. The main arm of the reservoir then extends up the Gros Ventre valley another four miles. Cottonwood, Fish and Bacon Creek drainages form arms on the north side of the valley. The high point of land between the dam site and the drainages to the north would form an island approximately 1,000 by 2,000 feet and nearly 125 feet above full pool.

The valley floor is predominantly grasslands with some groves of cottonwood trees. The wet bottoms along the meandering stream have abundant willow growth. Vegetation on the surrounding hills is primarily sagebrush and grass mixtures with a few isolated groves of aspen and lodgepole pine.

Population, climate, economy, and transportation into the Jackson Hole area are generally similar in nature to that affecting the Blackrock Reservoir site.

Access to the reservoir site is from the Jackson Hole Highway within Grand Teton National Park. This section of road between Moose (Park Headquarters) and Jackson carried approximately 604,800 non-commercial vehicles in 1963, which represents nearly 2,000,000 people. Traffic flow studies during this same period indicate an annual average daily travel of 115 non-commercial vehicles over the Park's east side loop road which serves Kelly and provides access to the Upper Gros Ventre River drainage. This suggests over 155,000 people during the 1963 calendar year traveled within 20 miles of the project site.

Recreation Areas in the Vicinity

The south boundary of Yellowstone National Park is 70 miles from the project site and as previously stated, Grand Teton National Park is

about 18 miles due west. Recreation opportunities are also offered in the heavily used Teton, Bridger, and Shoshone National Forests in the general area, which would influence use of the reservoir. Three Forest Service campgrounds located on the access road to the impoundment site provide a total of 21 family camp units and are designated as: Atherton Creek (15 miles east on Lower Slide Lake), Red Hills (10 miles east), and Crystal Creek (9 miles east).

Existing lakes and reservoirs in the area of influence and offering water recreation activities are listed below. Distance refers to the approximate air miles and direction from the Cottonwood Reservoir site; administering agency refers to the recreation facilities.

<u>Lake or Reservoir</u>	<u>Distance</u>	<u>Surface Acres</u>	<u>Admin. Agency</u>
Palisades Reservoir	45 SW	16,150	FS
Jackson Lake Reservoir	30 NW	25,700	NPS
Lewis Lake	55 NNW	2,750	NPS
Yellowstone Lake	60 N	87,400	NPS
Boysen Reservoir	100 ESE	19,660	Wyoming Parks Comm.

There are several popular lakes in the Pinedale vicinity which are about 45 air miles to the southeast of the project site. It is understood they receive considerable recreation use, predominantly fishing.

Effects of the Project on Existing and Potential Recreation Resources

Recreation use of this mountain valley is now primarily hunting and fishing. No developed recreation sites exist or are planned by the Forest Service within the impoundment site. There are two private dude ranches in the flood pool area that are estimated to receive some 2,300 visitor days of annual use. Approximately 600 acres in the reservoir site are privately owned, with the remainder being Forest lands.

Isolation of the site along with present road conditions discourages recreation use of the impoundment area. With current and future road improvements planned and the possibility of completing the connecting road link over Union Pass, it is anticipated that visitor use will greatly increase. Forest Service projection for 1976 is 11,660 visitor days of camping and picnicking use within the project area.

The Cottonwood Creek Reservoir would have a very scenic setting in this remote mountain valley. However, with the possibility of 115 feet drawdown during the visitor use period, recreation use would be discouraged. The south arm of the reservoir, the Gros Ventre River, would have nearly four miles of exposed mud flats one-half mile wide during maximum drawdown conditions. Most of the shoreline would have extensive mud flats except along the steep hillside to the east or opposite the dam. Because of unstable land conditions in the canyons above the

reservoir, heavy siltation would likely occur. This would feed extremely muddy waters into the reservoir, especially during spring runoff, and add to the extensive mud flat conditions. However, it is anticipated that with the project, recreation use would increase over what is now projected without the project.

In addition to camping, picnicking, and sightseeing, the reservoir would support various forms of water related activities such as boating, fishing, and some water skiing. As at other alternate reservoir sites in the Jackson Hole vicinity, early and late summer use would be primarily local with predominant tourist use anticipated during the months of June, July, and August. With installation of basic recreation facilities, it is estimated that initial annual attendance would total 9,900 visitor days. This represents an increase of nearly 4,950 visitor days of general recreation use annually through construction of the reservoir.

The Bureau of Sport Fisheries and Wildlife is concerned over the blocking of important spawning waters for cutthroat trout above the dam. There are nearly 150 miles of tributary streams above the impoundment site. The Bureau of Sport Fisheries and Wildlife anticipates an annual loss of 6,000 fisherman days in the reservoir pool area if the project is constructed.

The Gros Ventre River Valley furnishes an important winter range for large game animals. Some 800 elk are fed by the State Game and Fish Commission at a feeding ground site near the mouth of Fish Creek, which is within the impoundment area. Natural vegetative habitat of the reservoir site supports a portion of the 1,500 to 2,000 elk wintering in the Gros Ventre area. The willow bottoms also provide an excellent moose winter habitat. The Fish and Wildlife Service estimates an annual loss of over 6,000 big game hunting activity days with installation of the reservoir.

No known archeological or historical surveys of the reservoir area have been conducted. Such surveys should be accomplished if the project is authorized.

The Cottonwood dam proposal could adversely affect scenic qualities and biotic conditions along the Gros Ventre River within Grand Teton National Park through unseasonal or extreme water releases.

The Wyoming Game and Fish Commission, Bureau of Sport Fisheries and Wildlife, and the National Park Service have recommended against construction of this project. The U.S. Forest Service stated in its report that the Cottonwood Dam would have fewer adverse effects on their resources, administration, and multiple use management objectives than the Blackrock or Granite Creek proposals, but states that it would have adverse effects on big game habitat.

Recreation Development

Recreation developments recommended for installation at the Cottonwood Creek Reservoir site would include such facilities as surfaced interior roads, parking areas, picnic and campsites and facilities, shelters, drinking water and sanitary facilities, stock fencing, tree planting, and boating facilities such as launching ramps and docks. Installation of these basic recreation facilities for use at Bureau of Reclamation reservoirs is considered by the National Park Service to be a non-reimbursable Federal responsibility when administered by another Federal agency; in this case, it is assumed to be the Forest Service.

Estimated Monetary Benefits

The following estimated annual monetary benefits accruing from the Federally developed recreation facilities for the Cottonwood Unit follow the guidelines established by the "Evaluation Standards for Primary Outdoor Recreation Benefits", Supplement No. 1, Senate Document No. 97, dated June 4, 1964. General project recreation use includes such activities as picnicking, sight-seeing, camping, and boating. Estimates do not include benefits attributed to hunting or fishing.

Recreation use and related benefits are estimated as follows:

Initial Development

Use without project	4,950 visitor days
Initial use with project	<u>9,900</u> visitor days
Gain	4,950 visitor days

Benefits

Use without project	\$1.10	\$5,445
Initial use with project	.95	<u>9,405</u>
Gain		\$3,960

Optimum Development

Projection of use without project	42,250 visitor days
Ultimate use projection with project	<u>90,500</u> visitor days
Gain with project	42,250 visitor days

Benefits

Projection without project	\$1.10	\$49,775
Ultimate use projection with project	.95	<u>85,975</u>
Gain with project		\$36,200



At Colter Bay the swimming beach was left 39 vertical feet above the water level in 1961.

In unit values selected for general recreation use, adjustments reflect quality considerations of the proposed reservoir and its drawdown and siltation potential and esthetic appeal relative to existing conditions.

Upstream benefits are estimated on the basis that the 295,000 acre-feet of active storage capacity of Cottonwood Creek Reservoir would improve water levels on Jackson Lake through the transfer of the source of irrigation water supply.

Jackson Lake benefits are estimated as follows:

<u>Replacement Storage Acre-Feet</u>	<u>Upstream Benefits</u>		
	<u>Initial</u>	<u>1972</u>	<u>Ultimate</u>
295,000	\$414,000	\$590,200	\$822,800

Conclusions and Recommendations

The Cottonwood Reservoir proposal would affect downstream flows of the Gros Ventre River in Grand Teton National Park and therefore could adversely affect scenic aspects and ecology along the river in the Park.

Current recreation use of this reservoir area is substantial and primarily related to hunting and fishing. There would be significant losses to fish and big game values if the reservoir were constructed.

This high mountain valley would be inundated with a less desirable reservoir which would be subject to considerable drawdown. Although it is anticipated recreation use of the site would increase through construction of the project, esthetic and scenic qualities would be lowered because of a fluctuating water level and the siltation potential.

The Cottonwood Reservoir could provide partial replacement for water storage requirements necessary to stabilize Jackson Lake. However, because of the losses to conservation, fish and big game, and potential downstream effects, it is recommended this project not be given further consideration for replacement storage.

G. ELBOW DAM AND RESERVOIR

The Elbow Reservoir site is located within the Bridger National Forest on the Greys River. The dam site is in Section 6, T. 34 N., R. 16 W., 6th P.M., Lincoln County, Wyoming.

The reservoir would provide partial replacement water storage for Jackson Lake, some flood control, power production, recreation, and fish and wildlife. Operation of the Elbow Reservoir would be in

conjunction with the systems of Palisades and Jackson Lake. The average annual runoff at the site is estimated as 283,000 acre-feet, as compared to the reservoir's proposed active storage capacity of 345,000 acre-feet. Extreme fluctuation during the recreation season could be a maximum drawdown of 166 feet to dead storage. However, the Bureau of Reclamation estimates that drawdown to dead storage would probably occur on a frequency of less than one year in ten. The Elbow Reservoir would provide alternate storage capacity of 345,000 acre-feet or about 54 per cent of that required to stabilize Jackson Lake.

Reservoir Data

<u>Storage</u>	<u>Top of Elevation</u>	<u>Surface Acres</u>	<u>Capacity Acre-Feet</u>
Maximum water surface	6,818	2,620	450,000
Inactive	6,652	1,175	105,000

The dam would be an earth fill type about 360 feet above the streambed and probably over 2,000 feet long. It would create an impoundment about $7\frac{1}{2}$ miles long and with an average width of approximately one-half mile.

General Description of the Area

The Elbow Reservoir site is about 26 river miles upstream from the confluence of the Greys and Snake Rivers, which is near the Idaho-Wyoming border. The dam site is about one-half mile downstream from Deadman Creek and just below a sharp bend in the river known as the Elbow.

Access to the reservoir site is via 24 miles of gravel road from U.S. Highway 89 near Alpine, Wyoming. The road through the impoundment site also extends above the project and forms a junction with the east-west roads which connect the area of Star Valley to the west and the town of La Barge and Big Piney to the east.

The scenic mountain valley that would be inundated by Elbow Reservoir widens out to about one-half mile for nearly four miles above the dam site and the floor is generally flat. The upper reaches of the reservoir are confined to a narrow canyon. The valley floor has grassy meadows with the high adjacent hills covered with timber. Predominant trees are lodgepole pine with some spruce, fir and aspen. The wet lowlands and stream banks have considerable willow growth.

Local economic and transportation conditions affecting the site are generally similar in nature to that stated under the Alpine section of this report. The gravel road providing access to the project site connects with U.S. Highway 89. This highway carried an average daily travel of approximately 660 non-commercial vehicles in 1963, which

indicates nearly 875,000 people drove this all-weather route during that year. The intersection of the Greys River Road and U.S. 89 is only one mile from the Alpine Junction--U.S. Highways 89 and 26. Considerable traffic through this region can be associated with tourist travel during the recreation season of June through August.

Climatic conditions at the Elbow Reservoir area are mild during the recreation season. Annual precipitation is about 40 inches, most of which falls in the form of snow. Summers in the area are characterized by warm days and cool nights.

The primary local recreation importance of the reservoir is considered to be that of Teton, Sublette and the northern portion of Lincoln County in Wyoming. Portions of Caribou, Bear Lake, and Bonneville Counties in Idaho are considered to be in the zone of influence. According to the U.S. Bureau of Census Report for 1960, the population of this area was about 20,500. Afton, Wyoming (1960 population 1,337) and Jackson, Wyoming, (1960 population 1,437) are both approximately 60 road miles from the proposed dam site. Idaho Falls, Idaho, (1960 population 33,161) and Pocatello, Idaho, (1960 population 28,534) are about 95 and 140 road miles respectively to the west of the Elbow site.

Recreation Areas in the Vicinity

Grand Teton and Yellowstone National Parks south boundaries are about 75 and 125 road miles respectively to the north of the Elbow Reservoir site. Bridger National Forest, in which the reservoir is situated, as well as the nearby Caribou, Targhee, and Teton National Forests all offer outdoor recreation pursuits such as camping, picnicking, sightseeing, fishing, hunting, boating, hiking, etc.

Five Forest Service campgrounds are located along the Greys River road, offering a total of some 40 campsites. The Moose Flat development with 10 family units is approximately one mile below the dam site. Other campsites nearby are designated as follows: Greys River Bridge, Forks of the Greys River, Murphy Creek, and Forest Park. In addition there are five campgrounds with 129 sites adjacent to the Palisades Reservoir; eight campgrounds with nearly 110 sites in the Snake River Canyon; two campgrounds with 18 sites near Afton and Smoot; and two campgrounds with 13 sites west of Big Piney, all of which are administered by the Forest Service and located within a 35-mile radius of the Elbow site.

The following existing lakes and reservoirs in the vicinity of the Elbow Reservoir offer water-oriented recreation opportunities and would affect the use of the Elbow site. Distance refers to the approximate air miles and direction from the Elbow Reservoir site. Administering agency in the table refers to that of recreation facilities.

<u>Lake or Reservoir</u>	<u>Distance</u>	<u>Surface Acres</u>	<u>Admin. Agency</u>
Palisades Reservoir	25 NW	16,150	FS
Jackson Lake Reservoir	65 N	25,700	NPS
Lewis Lake	95 N	2,750	NPS
Yellowstone Lake	105 N	87,400	NPS
Big Sandy Reservoir	75 SE	2,500	Wyoming Parks Comm.
Fontenelle Reservoir	50 SE	7,400	NPS (Interim)
Bear Lake	70 SW	87,100	
Blackfoot River Reservoir	45 W		
Greys Lake	40 W		
American Falls Reservoir	110 W	56,000	Idaho Land Comm.

Also within the zone of influence are the popular lakes near Pinedale, 45 air miles to the east. These lakes are within the Bridger National Forest and recreation opportunities include fishing, hunting, boating, camping, picnicking, swimming, sightseeing and hiking.

Effects of the Project on Existing and Potential Recreation Resources

Recreation use of this scenic mountain valley is now primarily hunting and fishing, with some picnicking and camping in undeveloped areas. Only one existing campground is within the impoundment site. However, about 100 acres have been designated as suitable for future recreation development, and the Forest Service estimates a need for 250 family camping units by 1976 within the area to be inundated. Alternate or replacement sites surrounding the reservoir pool are considered to be of lower quality because of the topography and fluctuating reservoir level.

The Greys River provides an excellent cutthroat trout fishery and receives heavy pressure from local and non-resident fishermen. Approximately 13 miles of streams would be inundated by a reservoir at the Elbow site and the spawning areas above the reservoir would be blocked. The Bureau of Sport Fisheries and Wildlife estimates an overall annual loss of about 4,000 fisherman days in the reservoir area if the project is constructed.

A reservoir at the site would have a very picturesque setting in this high mountain valley. However, as the primary purpose of the reservoir would be for replacing the irrigation yield from Jackson Lake, extreme drawdown during summer months could be anticipated. Drawdown to the inactive pool level at elevation 6,652 or 166 foot vertical drop of the water surface would result in the upper 3½ miles of reservoir being nothing but mud flats.

Recreation use of the reservoir would include fishing, boating, camping, picnicking, and some water skiing. Early and late season use would be primarily local; June through August use would be predominantly tourist.

It is estimated that with installation of adequate facilities, initial annual attendance would total 41,900 visitor days of general recreation use. This represents a net loss of 4,650 visitor days of use through installation of the project as compared to what is anticipated without the reservoir.

The Bureau of Sport Fisheries and Wildlife has stated that an impoundment at the Elbow site would flood valuable winter range for elk, deer, and moose. There would be approximately 180 acres of willow bottom land and some 1,800 acres of other crucial big game winter range destroyed by the impoundment. The Fish and Wildlife Service estimates an annual loss of 2,900 big game hunting activity days if the Elbow dam is constructed. Two commercial hunting camps and a dude ranch are located within the area to be flooded.

No known archeological or historical surveys of the reservoir area have been made. Such surveys should be accomplished if the project is authorized.

The Wyoming Game and Fish Commission, U.S. Forest Service, Bureau of Sport Fisheries and Wildlife, and the National Park Service have expressed opposition to the construction of the Elbow reservoir.

Recreation Development

It is anticipated that a net loss of recreation attendance would result from the formation of the reservoir through its adverse effects. However, if the project is authorized, the public would use the reservoir for recreation purposes and recreation facilities should be installed.

Recreation developments recommended for the installation at the Elbow reservoir site would include such facilities as surfaced interior roads, parking areas, picnic and camp sites, drinking water and sanitation facilities, stock fencing, and boating facilities such as launching ramps and docks. Installation of these basic recreation facilities for use at Bureau of Reclamation reservoirs is considered to be a non-reimbursable Federal responsibility when administered by another Federal agency.

Estimated Monetary Benefits

The following estimated annual monetary benefits arising from the Federally developed recreation facilities for the Elbow Unit follow the guidelines established by the "Evaluation Standards for Primary Outdoor Recreation Benefits", Supplement No. 1, Senate Document No. 97, dated June 4, 1964. Estimates do not include benefits attributed to hunting or fishing. General project recreation use includes such activities as sightseeing, picnicking, boating, and camping.

Recreation use and related benefits are estimated as follows:

Initial Development

Use without project	46,550 visitor days
Initial use with project	<u>41,900</u> visitor days
Loss	4,650 visitor days

Benefits

Use without project	\$1.20	\$55,860
Initial use with project	\$1.00	<u>41,900</u>
Loss		\$13,960

Optimum development

Projection of use without project	147,100 visitor days
Ultimate use projection with project	<u>132,360</u> visitor days
Loss	14,740 visitor days

Benefits

Projection without project	\$1.20	\$176,520
Ultimate use projection with project	\$1.00	<u>132,360</u>
Loss		\$ 44,160

In unit values selected, consideration was given to the character of the proposed reservoir, its volume drawdown, suitability of recreation sites, and esthetics as related to existing conditions.

Upstream annual benefits have been estimated on the basis that the 345,000 acre-feet of active storage capacity of the Elbow Unit would improve water levels at Jackson Lake through transfer of the source of irrigation water supply.

Jackson Lake benefits are estimated as follows:

<u>Replacement Storage Acre-Feet</u>	<u>Upstream Benefits</u>		
	<u>Initial</u>	<u>1972</u>	<u>Ultimate</u>
345,000	\$508,700	\$724,900	\$1,010,000

Conclusions and Recommendations

Construction of the Elbow Dam and reservoir would result in a loss of recreation value. The affected site is heavily used by fishermen,

hunters and campers. There are developed and well maintained Forest Service campgrounds and several potential recreation sites in the reservoir pool area. The proposal would result in a loss of fish and wildlife values. The present high value of the project site to recreationists outweighs the value occurring to the visiting public at the Elbow reservoir if the dam would be constructed.

Although the Elbow reservoir could provide partial replacement for water storage requirements necessary to stabilize Jackson Lake, it is recommended this project not be given further consideration for that purpose.

H. BLACKROCK DAM AND RESERVOIR

Project Data

The Blackrock Reservoir site is located within Teton National Forest on the Buffalo Fork drainage. The Buffalo Fork and Snake River confluence is five miles downstream from Jackson Lake dam. The dam site is in Sections 19 and 30, T. 45 N., R. 112 W., 6th P.M., Teton County, Wyoming.

In addition to serving as partial replacement storage for Jackson Lake, the Blackrock dam and reservoir would provide some flood control along the Snake River in Jackson Hole, a power plant is being considered, and functions would also include recreation, fish and wildlife. Blackrock reservoir's operation would be essentially the same as present operation of Jackson Lake. Extreme fluctuation during the recreation season could be a maximum drawdown of 125 feet to dead storage or elevation 6,975. The Blackrock reservoir would provide alternate storage capacity of 354,000 acre-feet, or about 55 per cent of that required to stabilize Jackson Lake.

Reservoir Data

<u>Storage</u>	<u>Top of Elevation</u>	<u>Surface Acres</u>	<u>Capacity Acre-feet</u>
Maximum water surface	7,100	3,540	533,000
Inactive	6,975	2,475	179,000

The dam would be an earth fill structure about 270 feet above the present channel of the Buffalo Fork. It would create an impoundment about 7.5 miles long and 1.3 miles wide when full.

The upper reaches of the reservoir would invade the Teton Wilderness area by nearly one mile and a distance of about one-quarter of a mile wide.

General Description of the Area

The Blackrock Reservoir site on the Buffalo Fork is at the extreme northeast edge of Jackson Hole. The valley that would be inundated by the Blackrock reservoir is about one mile wide and generally flat with the upper reaches being confined to a narrow wooded canyon. The valley floor is grassy meadow sprinkled with groves of aspen, cottonwood, and a few spruce. The meandering stream bank and wet bottom lands have considerable willow growth. The sides of the valley are timber covered rolling hills with vegetation being primarily lodgepole pine and some spruce and fir on north facing slopes.

Local economic, transportation and climatic conditions affecting the site are generally similar in nature to that stated under the Jackson Lake section of this report.

The primary local recreation importance of the reservoir is considered to be that of Teton County and the Dubois Division of Fremont County, both in Wyoming. According to the 1960 census, this area had a total population of about 4,000. Jackson, (1960 population 1,437) about 40 miles southwest and Dubois (1960 population 574), 50 miles east, are the largest towns near the reservoir site. Lander (1960 population 4,182) and Riverton (1960 population 6,845), are approximately 130 miles to the east. Access from the east into Jackson Hole is via U.S. Highway 26-287, which carried an annual average daily travel of 543 vehicles (does not include commercial traffic) in 1963, or probably more than 710,000 people during the calendar year. Access to the north side of the dam would be via six miles of surfaced road from U.S. Highway 26-287.

Recreation Areas in the Vicinity

Grand Teton National Park is only four miles from the project site and Yellowstone National Park is 30 miles to the north. Outstanding diversified outdoor recreation opportunities, including those which are water-oriented, are available.

The following existing lakes and reservoirs in the vicinity of the Blackrock reservoir offer water-oriented recreation activities. Their recreation development and potential affect the influence of the Blackrock site. Distance in the table refers to the approximate air miles and direction from the Blackrock reservoir site. Administering agency refers to that of recreation facilities.

<u>Lake or Reservoir</u>	<u>Distance</u>	<u>Surface Acres</u>	<u>Admin. Agency</u>
Jackson Lake reservoir	10 W	25,700	NPS
Lewis Lake	35 NW	2,750	NPS
Yellowstone Lake	40 N	87,400	NPS

Palisades Reservoir	65 SW	16,150	FS
Boysen Reservoir	120 ESE	19,660	Wyoming Parks Comm.
Buffalo Bill Reservoir	75 NE	6,710	Wyoming Parks Comm.

There are several small lakes in the general vicinity which also receive considerable use. Lower Slide Lake, nearly 20 miles straight south of the Blackrock reservoir site on the Gros Ventre River, is a popular geological attraction. Camping and water activities are available under the auspices of Teton National Forest. Grassy Lake reservoir situated between Grand Teton and Yellowstone National Parks, was constructed by the Bureau of Reclamation and provides recreation use, predominantly fishing, with a surface area of about 310 acres. There are several lakes noted for fishing in the Pinedale vicinity, some 70 air miles to the southeast.

Three Forest Service campgrounds are located within a 4-mile radius of the Blackrock reservoir site and adjacent to U.S. Highway 26-287. These campgrounds provide a total of 20 family units and are designated as follows: Hatchet, Lava Creek, and Four Mile Meadow campgrounds. There are additional campgrounds and other diversified recreation opportunities offered in the Teton and Shoshone National Forests.

Effects of the Project on Existing and Potential Recreation Resources

This scenic mountain valley presently offers many recreation resources. The Turpin Meadow campground operated by the Forest Service is near the upper end of the reservoir area and provides one of the main access points into the Teton Wilderness Area. This campground is scheduled for improvement in 1965. The Forest Service anticipates a need for a total of 84 family camping units by 1976 to meet the increasing demand. They have also designated three additional potential recreation sites for swimming, resorts, and another camp or picnic development. All of these sites would be inundated by the reservoir. Alternate or replacement sites surrounding the reservoir pool are considered to be of lower quality.

Trout fishing in the Buffalo Fork is a popular recreation pursuit. The Bureau of Sport Fisheries and Wildlife estimates an overall annual loss of 3,500 fisherman days in the reservoir area with installation of the project. They have also recommended enlargement of the minimum pool. A reservoir would destroy about 10 miles of stream fishing and block cutthroat trout migration to some 90 or 100 miles of tributary streams. A dude ranch and some 19 summer homesites located in the valley would be inundated and probably would not be relocated because of site conditions. The Forest Service reported 6,360 activity days for these two types of use in 1962.

Although a reservoir at full pool would have a fine scenic setting, drawdown conditions would have an adverse effect over present conditions. The recreation potential and quality would depend on fluctuation during the summer season. Irrigation demands, if this is to

serve as alternate storage for Jackson Lake, will require considerable fluctuation which would adversely affect recreation use. Present recreation use and value of the reservoir site is significant. General recreation use is estimated to be 26,800 visitor days annually.

The reservoir would support activities in the form of boating, fishing, and water skiing as well as picnicking and camping. Early and late summer use would be primarily from the surrounding community. Visitor use during June through August would be predominantly tourist. It is estimated that with installation of adequate facilities, initial annual attendance would total 24,800 visitor days of general recreation use. This represents a net loss of nearly 2,000 visitor days of recreation use through construction of the reservoir.

The Bureau of Sport Fisheries and Wildlife has indicated this valley is an important big game habitat. Some 3,500 acres of prime winter range is available for moose. Elk and deer also utilize the project area as winter habitat. The reservoir area is also crossed by a large segment of the elk herd. This elk migration is from the summer range in the Teton Wilderness Area and southern Yellowstone National Park to winter range on the Gros Ventre. The Bureau of Sport Fisheries and Wildlife estimates an annual loss of about 4,400 big game hunting activity days with construction of the project.

The Blackrock dam could adversely affect the scenic aspects and biotic conditions along the Buffalo Fork and Snake Rivers within Grand Teton National Park.

No known archeological or historical surveys of the reservoir area have been made. Such surveys should be accomplished if the project is authorized.

Recreation Development

Existing recreation facilities would require relocation or replacement to meet minimum basic requirements. These include roads, trails, camp and picnicking units, with related parking areas and utilities. To accommodate the water-related activities the following facilities should also be provided for the initial enjoyment and safety of the visiting public and to protect the project: access roads, launching ramps, signs, parking areas, sanitary facilities and other related utilities.

Estimated Monetary Benefits

It is estimated that a net loss of recreation attendance would result from the formation of this reservoir through its adverse effects. However, if the project were authorized, the public will use the reservoir for recreation purposes and the recommended facilities should be installed.

The following estimated annual monetary benefits accruing from the Federally developed recreation facilities for the Blackrock Unit follow the guidelines established by the "Evaluation Standards for Primary Outdoor Recreation Benefits", Supplement No. 1, Senate Document No. 97, dated June 4, 1964. Estimates do not include benefits attributed to hunting or fishing. General project recreation includes such activities as picnicking, sightseeing, boating, camping, and use of trails by hiking or riding.

Recreation use and related benefits are estimated as follows:

Initial Development

Use without project	26,800 visitor days
Initial use with project	<u>24,800</u> visitor days
Loss	2,000 visitor days

Benefits

Use without project	\$1.15	\$30,820
Initial use with project	\$1.00	<u>24,800</u>
Loss		\$ 6,020

Optimum development

Projection without project	64,750 visitor days
Ultimate use projection with project	<u>59,900</u> visitor days
Loss	4,850 visitor days

Benefits

Projection without project	\$1.15	\$74,460
Ultimate use projection with project	\$1.00	<u>59,900</u>
Loss		\$14,560

In unit values selected, consideration was given to the character of the proposed reservoir and its drawdown relative to existing conditions.

Upstream benefits have been estimated on the basis that 354,000 acre-feet of active storage capacity in the Blackrock Unit would improve water levels at Jackson Lake.

Jackson Lake benefits are estimated as follows:

<u>Replacement Storage Acre-Feet</u>	<u>Upstream Benefits</u>		
	<u>Initial</u>	<u>1972</u>	<u>Ultimate</u>
354,000	\$520,500	\$742,000	\$1,034,300



One hundred yards from the Visitor Center. A Park Service sign identifies the Colter Bay Marina - 1961.

Conclusions and Recommendations

The Blackrock reservoir proposal would affect downstream flows of the Buffalo Fork and Snake Rivers within Grand Teton National Park. Unseasonal or extreme water releases would adversely affect the scenic qualities and biotic conditions along these rivers.

The reservoir would invade a portion of the Teton Wilderness Area by nearly one mile.

The Blackrock reservoir area has high recreation values and is used extensively for hunting, fishing, and camping. Existing and potential recreation development sites would be inundated plus installation of the proposal would result in a loss of fish and big game values.

The Blackrock reservoir could provide partial replacement storage necessary to stabilize Jackson Lake. However, it is recommended this project not be given further consideration for the purposes of alternate storage because of losses related to recreation values and conservation.

I. GRANITE CREEK DAM AND RESERVOIR

Project Data

The Granite Creek reservoir site is located on the Hoback River and within the boundaries of Teton National Forest. The dam site is in Section 4, T. 38 N., R. 114 W., 6th P.M., Sublette County, Wyoming. This site is about 13 miles upstream from where the Hoback River joins the Snake River.

The reservoir would serve as partial replacement of irrigation water now stored in Jackson Lake, some flood control, power production, recreation, and fish and wildlife functions. With coordinated operation of Granite Creek reservoir and Palisades, it is anticipated that water control could be somewhat similar as it is in Jackson Lake now, with holdover of water for recreation purposes as long as possible. However, extreme fluctuation during the recreation season could occur and might be a maximum of 151 foot drawdown, or to dead storage at elevation 6,449. The Granite Creek reservoir would provide 403,000 acre-feet of alternate storage capacity for Jackson Lake, or approximately 63 per cent of that required for stabilization.

<u>Storage</u>	<u>Top of Elevation</u>	<u>Surface Acres</u>	<u>Capacity Acre-Feet</u>
Maximum water surface	6,600	4,325	470,000
Inactive	6,449	1,180	67,000

The dam would be an earth fill structure about 325 feet in height above the Hoback River streambed and nearly 1,350 feet in length.

It would have an impoundment of about 11 miles in length, varying in width from one-fourth to three-fourths mile.

General Description of the Area

The Granite Creek reservoir site on the Hoback River is to the southeast of Jackson Hole in a very scenic valley. The dam site is just below the confluence of Granite Creek and the Hoback River. About five miles of the Hoback River canyon above the dam site and the tributary stream canyons of Granite, Shoal, and Cliff, are all winding, narrow, steep-sided and generally heavily timbered. The upper reaches of the reservoir site widen into a level valley about three-fourths of a mile in width with adjacent low rolling sagebrush covered hills. Granite, Shoal, and Cliff Creek canyons would form arms of the reservoir approximately six, four, and two miles in length respectively. Dell Creek, at the upper end of the impoundment, would form a wide arm (about three-fourths of a mile) and nearly three miles in length when full, but completely void of water at inactive pool level.

The flat valley floor in the upper portion of the reservoir is primarily devoted to irrigated hay and pasture lands. Vegetation present at the site includes sagebrush and grasses on the hillsides at the upper end of the reservoir, primarily willows along the stream banks and wet bottom lands, and lodgepole pine, spruce, and fir near the dam site and in the other narrow canyons.

Scenic qualities are outstanding, especially in the wooded canyons along the Hoback River and Granite Creek.

Climate conditions at the site are generally similar in nature to that at Jackson Lake. The average annual precipitation is 26 inches, most of it falling in the form of snow.

U.S. Highway 187-189, which passes through the reservoir and dam site, is a major access route to Jackson Hole from U.S. Highway 30 - Interstate 80. Traffic flow studies for 1963 show an average daily travel of 370 non-commercial vehicles over this all-weather road, or about 486,000 people drove through the reservoir site in 1963.

The reservoir area is about 13 miles east of U.S. Highway junction 187-189 and 26-89. The nearest railroad terminals are Victory, Idaho, about 80 miles to the northwest, and Rock Springs, Wyoming, approximately 140 road miles to the southeast.

The primary local recreation importance of the Granite Creek reservoir is considered to be that of Sublette and Teton Counties, and the Star Valley Division of Lincoln County, all in Wyoming. According to the 1960 census, this area had a total population of about 11,300. Access, physical barriers, and areas offering similar recreation

opportunities affect the local recreation zone of influence. Sublette County showed an increase of 52 percent and Teton County an 18 percent increase in population since 1950. Jackson (1960 population 1,437) about 30 miles to the northwest, and Pinedale (1960 population 965) 45 miles to the southeast, are towns nearest the reservoir site. Afton (1960 population 1,337) is about 70 miles to the southwest; Rock Springs, Wyoming (1960 population 10,371) is approximately 140 road miles to the southeast; and Idaho Falls, Idaho (1960 population 33,161) is nearly 110 miles to the west.

The economy of these counties (Sublette, Teton, and Lincoln) is centered primarily around tourism and agriculture. The employed labor force for 1960 in Teton County was 1,138, of which 167 were engaged in agriculture; 59 in manufacturing, and 912 in other industries. Sublette County's labor force totaled 1,430, of which 437 were engaged in agriculture; 47 in manufacturing, and 946 in other industries. Lincoln County, with about 73 percent of the population classified as rural-farm, had a labor force of 3,152, of which 761 were engaged in agriculture; 217 in manufacturing, and 2,174 in other industries. Median family incomes averaged as follows for the counties: Teton, \$6,079; Sublette, \$5,365; and Lincoln, \$4,755. It is expected the present economic and social characteristics will continue along present trends.

Recreation Areas in the Vicinity

The project site is about 35 and 85 miles respectively from the south boundaries of Grand Teton and Yellowstone National Parks.

Teton National Forest has three recreation developments near the proposed reservoir site. Hoback campground, three miles west of the dam site and adjacent to U.S. Highway 187-189, has 20 family camping units. The Granite Creek campground appears to be above the maximum water surface, but would probably lose the existing high scenic quality setting because of nearby mud flats created by reservoir fluctuations. The Granite Creek campground has 42 developed campsite facilities. The Granite Hot Springs development provides swimming and picnicking and would be about two miles above maximum pool in the Granite Creek canyon. Other developments providing diversified recreation opportunities are in the nearby Targhee, Bridger, and Caribou National Forests.

The following lakes and reservoirs in the general vicinity of the Granite Creek reservoir site offer water-oriented recreation activities. Their recreation development and potential would affect the zone of influence around the Granite Creek reservoir site.

Distance in the table refers to the approximate air miles and direction from the Granite Creek reservoir site. Administering agency refers to that of recreation facilities.

<u>Lake or Reservoir</u>	<u>Distance</u>	<u>Surface Acres</u>	<u>Admin. Agency</u>
Palisades Reservoir	30 W	16,150	FS
Jackson Lake Reservoir	40 NNW	25,700	NPS
Lewis Lake	70 NNW	2,750	NPS
Yellowstone Lake	80 N	87,400	NPS
Big Sandy Reservoir	90 SE	2,500	Wyoming Parks Comm.
Fontenelle Reservoir	80 SSE	7,400	NPS (Interim)

Several lakes in the general vicinity of Pinedale are approximately 40 air miles to the southeast of the project site. As stated under the Cottonwood dam section, these lakes do provide popular fishing water. They would have more influence on the Granite Creek site than on the Cottonwood unit because of the proximity and access. These lakes are within the Bridger National Forest and there are eight developed campgrounds containing nearly 120 family units.

Effects of the Project on Existing and Potential Recreation Resources

The Granite Creek reservoir would have a major effect on existing recreation resources in a very scenic valley.

Construction of this project would inundate Kozy campground and three roadside picnic areas operated by the Forest Service. These constitute 11 family units with current use of the campground estimated at 2,880 annual visitor days.

The Forest Service has two designated future recreation sites classified within the impoundment area with an estimated capacity of 270 family units. Alternate or replacement sites surrounding the reservoir pool are considered to be limited and of lower quality. They estimate a need for 468 family units by 1976 to meet recreation demands with the project and 531 units if the dam is not constructed.

Summer homesites in Granite Creek canyon would be adversely affected; although they are probably above high water, there would be a loss of esthetic values with nearby mud flats. The summer homesites currently represent an estimated annual 1,500 visitor days of use. Three dude ranches on private land within the impoundment site would also be inundated. There are about 1,900 acres of private land within the site with the remainder being National Forest lands.

The Hoback River, Granite Creek and other major tributary streams are heavily used by fishermen. A reservoir at this site would destroy about 23 miles of stream fishing and block cutthroat trout brood stock migration to some 180 miles of upstream tributaries. The Bureau of Sport Fisheries and Wildlife estimates an overall annual loss of approximately 12,000 fisherman days in the reservoir pool area with construction of the project.

The existing scenic canyon approach road to Jackson Hole along the Hoback River would have to be relocated. Mud flats and unnatural exposed reservoir shorelines created by drawdown would be undesirable from an esthetic and recreation standpoint. At full pool the Granite Creek reservoir would have a very attractive setting. However, irrigation demands would necessitate a fluctuating pool during the recreation season. The amount of drawdown during the main visitor season would seriously affect or alter the recreation use and potential.

Granite Creek reservoir would support recreation activities such as camping, picnicking, boating, fishing, swimming, and water skiing. National recreation attraction of the Jackson Hole area, which affects travel through the Hoback Canyon, develops the visitor pattern as being predominantly tourist use during June, July, and August. Early and late season use would be primarily local. With initial basic recreation facilities installed at the Granite Creek reservoir to accommodate general recreation users, it is estimated that annual attendance would total 134,300 visitor days. This represents a net loss of nearly 13,800 visitor days of recreation use with construction of Granite Creek dam.

The Bureau of Sport Fisheries and Wildlife has expressed concern over loss of big game habitat. Elk and deer utilize the reservoir area as spring and fall range. Moose use the willow bottom as winter range and nearly 1,000 acres of this habitat would be lost by installation of a dam. The Fish and Wildlife Service estimates an annual loss of 5,500 big game hunting activity days if the Granite Creek dam is constructed. The Wyoming Game and Fish Commission, Bureau of Sport Fisheries and Wildlife, U.S. Forest Service, and the National Park Service are strongly opposed to construction of the Granite Creek dam proposal because of these major adverse effects.

Recreation Development

Replacement of existing recreation facilities would be required to meet minimum basic requirements. This would include roads, camping and picnicking units, parking areas, and utilities. To accommodate the requirements of the visiting public and provide for its initial enjoyment and safety and to protect the project the following facilities should also be provided for water-related activities: access roads, launching ramps, signs, stock fencing, parking areas, sanitary facilities, and other related utilities.

Estimated Monetary Benefits

A net loss of recreation attendance would result from the formation of this reservoir. However, if the project were authorized the public will use the reservoir for recreation purposes and the recommended basic facilities should be installed.

The following estimated annual monetary benefits accruing from the Federally developed recreation facilities for the Granite Creek unit follow guidelines established by the "Evaluation Standards for Primary Outdoor Recreation Benefits", Supplement No. 1, dated June 4, 1964. General project recreation includes such activities as picnicking, camping, boating, swimming, and sightseeing.

Recreation use and related benefits are estimated as follows:

Initial Development

Use without project	148,100 visitor days
Initial use with project	<u>134,300</u> visitor days
Loss	13,800 visitor days

Benefits

Use without project	\$1.25	\$185,125
Initial use with project	\$1.00	<u>134,300</u>
Loss		\$ 50,825

Optimum Development

Existing use projection without project	277,500 visitor days
Ultimate use projection with project	<u>251,900</u> visitor days
Loss	25,600 visitor days

Benefits

Existing use projection without project	\$1.25	346,875
Ultimate use projection with project	\$1.00	<u>251,900</u>
Loss		\$ 94,975

In unit values selected for the general recreation use, adjustments reflect quality consideration of the proposed reservoir and its draw-down, recreation sites available, and esthetics relative or compared to existing conditions.

Upstream benefits are estimated on the basis that the 403,000 acre-feet of active storage capacity of Granite Creek reservoir would improve water levels on Jackson Lake through transfer of water rights.

Jackson Lake Benefits are estimated as follows:

Replacement Storage Acre-Feet

<u>Upstream Benefits</u>		
<u>Initial</u>	<u>1972</u>	<u>Ultimate</u>
403,000	\$650,600	\$927,400
		\$1,292,900

Conclusions and Recommendations

The Granite Creek reservoir proposal would not have a direct impact on National Park Service areas. However, it would have extreme adverse effects upon a section of the Hoback Canyon that has outstanding scenic beauty and interesting geologic formations. The Hoback, as the Snake River Canyon, is an extensively used approach route for recreationists to Jackson Hole, Grand Teton and Yellowstone National Parks.

Existing and potential recreation sites are situated along the Hoback River and tributary streams, particularly Granite and Cliff Creeks. Construction of the project would also be detrimental to wildlife and fishing values present at the site.

The Granite Creek reservoir could provide partial replacement storage necessary to stabilize Jackson Lake. However, it is recommended this project not be given further consideration for that purpose because of the major adverse effects.

J. ALPINE DAM AND RESERVOIR

Project Data

The Alpine reservoir site is located on the Snake River in Lincoln and Teton Counties, Wyoming. The dam site is about 3½ miles upstream from the Idaho-Wyoming boundary in Lincoln County, Wyoming. The reservoir would primarily inundate lands within Bridger, Targhee, and Teton National Forests.

The proposal would provide alternate storage for Jackson Lake stabilization, additional capacity for irrigation, hydro-electric power production, some flood control, recreation, and fish and wildlife functions. The Alpine reservoir would have an active storage capacity of 878,000 acre-feet, therefore, it could provide the alternate storage capacity required for stabilization of Jackson Lake, which is 640,000 acre-feet. Some drawdown would occur during the irrigation season, which lasts until approximately October 1, with additional water releases being required for power and flood control purposes. Fluctuation during the primary recreation season, June through August, could be a maximum of 154 vertical feet or down to the inactive pool elevation of 5,846.

Reservoir Data

<u>Storage</u>	<u>Top of Elevation</u>	<u>Surface Acres</u>	<u>Capacity Acre-Feet</u>
Maximum water surface	6,000	9,648	1,078,000
Inactive	5,846	3,360	200,000



Jackson Lake Reservoir near Colter Bay - 1961.

The dam would be an earth fill type structure about 440 feet above streambed and approximately 1,300 feet long at crest. It would create an impoundment about 29 miles long when full, varying in width from approximately 0.2 to 1.2 miles.

General Description of the Area

The Alpine reservoir site is located in a very narrow, steep-sided, V-shaped portion of the Snake River Canyon. That section of the canyon between the proposed dam site and Bailey Creek, approximately 11 miles, is known as the Grand Canyon of the Snake River. Terry Peak, to the north of the dam site is over 4,000 feet above the streambed.

The reservoir would extend up the Snake River approximately 29 miles, which includes the 8 miles above the confluences of the Hoback and Snake Rivers. The upper 3 miles of the reservoir and in the vicinity of Game Creek, would be the widest portion, being nearly 1.2 miles.

Vegetation in the narrow walled canyon is predominantly a coniferous forest with lodgepole pine, Douglas fir, and Englemann spruce present. Groves of aspen and Rocky Mountain maples, scattered along the south facing canyon walls, add bright colors to this section of the Snake River Canyon in fall. Large groves of cottonwood occur along the river banks and bottom lands.

Approximately 1,000 acres in the upper reaches of the impoundment area are cultivated or pasture lands. Of the nearly 9,650 acres that would be flooded, 7,700 acres are within the Bridger, Targhee, and Teton National Forests. Private lands within the Forest Service boundaries total nearly 1,730 acres.

The Grand Canyon of the Snake River provides a very scenic route for U.S. Highway 26-89, a major access road to the Jackson Hole region from the west. Traffic flow studies by the Wyoming State Highway Commission for 1963 show an average daily travel of about 720 non-commercial vehicles through the Snake River Canyon. This indicates a total of over 260,000 vehicles traveled the all-weather highway, or about 946,000 people drove through the canyon in 1963.

The reservoir would inundate the existing Hoback Junction (U.S. Highways 187-189 and 26-89) which is in the vicinity of where the Hoback River joins the Snake River. Travel figures for the section of highway between the Hoback Junction and the town of Jackson, adjacent to the upper eight miles of the proposed reservoir, show a use of approximately 365,000 non-commercial vehicles or probably over 1½ million people in 1963. It is assumed that with the national recreation attraction of the Jackson Hole region, travel will continue to increase along present trends.

The nearest railroad terminals are Victor, Idaho, about 50 miles to the northwest and Rock Springs, Wyoming, about 160 miles to the southeast.

The primary local recreation importance of the Alpine reservoir is considered to affect the same general area in Wyoming as that shown for the Granite Creek reservoir. In addition, portions of Teton, Bonneville and Caribou Counties in Idaho would be in the zone of influence. According to the U.S. Bureau of Census Report for 1960, the population of this area was about 18,200. Jackson, Wyoming, (1960 population 1,437) about six miles north, and Afton, Wyoming, (1960 population 1,337) about 35 miles south, are the nearest communities to the reservoir area. Montpelier, Idaho, (1960 population 3,146) is about 85 miles to the southwest; Pocatello, Idaho, (1960 population 28,534) is approximately 125 road miles to the southwest; Blackfoot, Idaho, (1960 population 7,378) is approximately 100 road miles to the west; Idaho Falls, Idaho, (1960 population 33,161) is about 70 miles to the northwest; and Rock Springs, Wyoming, (1960 population 10,371) is approximately 160 miles to the southeast.

Climatic conditions at the site are generally similar in nature to that in Jackson Hole. Temperatures sometimes reach into the 90's on warm summer days; evenings can be quite cool. Winter and snow-fall conditions are also comparable.

Recreation Areas in the Vicinity

The Alpine reservoir would be only 10 miles south of Grand Teton National Park's south boundary, and 60 miles south of Yellowstone's boundary.

Many recreation opportunities are offered by the four heavily used National Forests in the immediate vicinity--Teton, Targhee, Bridger, and Caribou. Waters of the proposed 29-mile long Alpine reservoir would flood lands in the first three Forests listed.

The Hoback and Kozy campgrounds in Teton Forest are located four and nine miles respectively above the impoundment site. These two campgrounds, which are located along the Hoback River, provide 28 family camping units. There are five campgrounds adjacent to the nearby Palisades reservoir maintained by the Forest Service with a total of 129 family units.

Existing lakes and reservoirs within the area of influence and offering water recreation activities are listed below. Distances refer to the approximate air miles and direction from the Alpine reservoir site. Administering agency refers to that of recreation facilities.

<u>Lake or Reservoir</u>	<u>Distance</u>	<u>Surface Acres</u>	<u>Admin. Agency</u>
Palisades Reservoir	5 W	16,150	FS
Jackson Lake Reservoir	50 N	25,700	NPS
Lewis Lake	80 N	2,750	NPS
Yellowstone Lake	90 N	87,400	NPS
Bear Lake	80 SSW	87,100	NPS
American Falls Reservoir	100 WSW	56,000	Idaho Land Comm.
Fontenelle Reservoir	80 SSE	7,400	NPS (Interim)
Big Sandy Reservoir	100 SE	2,500	Wyoming Parks Comm.

There are other lakes in the general vicinity of the proposal that offer recreation activities. The lakes in the Pinedale vicinity are noted for their fishing; these are about 60 air miles to the south-east of the Alpine dam site. Grays Lake and Blackfoot River reservoir are approximately 25 and 40 miles respectively to the southwest of the Alpine site in Idaho.

Effects of the Project on Existing and Potential Recreation Resources

This outstanding scenic river canyon is a recreation area in itself. The U.S. Forest Service has provided six recreation developments in the canyon that would be flooded if the Alpine dam were constructed. These developments currently provide a total of nearly 80 family units in the following campgrounds: Station Creek, Cabin Creek, East Table Creek, Elbow, Little Cottonwood, and Wolf Creek. These sites are administered by the Targhee National Forest.

Alternate or replacement sites surrounding the reservoir pool, are considered to be of lower quality because of the rugged terrain and drawdown potential; suitable sites would be extremely limited.

In addition to superlative scenery, the Snake River Canyon is renowned as a trout fishing stream. The Bureau of Sport Fisheries and Wildlife estimates an overall annual loss of 31,000 fisherman days in the reservoir area of the project. Fishing would be radically changed because of the loss of cutthroat trout spawning habitat.

The reservoir would support activities in the form of camping, pic-nicking, boating, fishing, and some water skiing and possibly swimming. Early and late summer use would be primarily from the surrounding community. Because of the proximity to Grand Teton and Yellowstone National Parks and the Jackson Hole region, tourist travel would continue to predominate use of the Snake River Canyon during June through August.

The existing scenic canyon road, U.S. Highway 26-89, would have to be relocated above the reservoir site, probably on the north side. This construction would necessitate a huge scar high on the canyon wall because of the nature of the terrain. The Alpine reservoir would have a very scenic canyon setting. However, water releases for

irrigation demands downstream and power production would be required with the results of a fluctuating pool during the recreation season. The amount of drawdown during the main recreation season would seriously affect or alter the recreation use and potential of the Alpine site.

Complete drawdown of 154 feet would expose nearly 11 miles of mud flats at the upper reaches of the reservoir impoundment with a width up to 1.2 miles. A three mile arm of the reservoir up the Hoback River (above the confluence with the Snake River) would be drawn down to the original streambed. Exposed mud flats in the vicinity of the Hoback Junction would greet the nearly 1½ million visitors or more expected to drive this route each year. Extreme drawdown conditions would leave developed recreation sites far removed from the water surface with exposed mud flats and unnatural shores separating them.

Present use of this outstanding and natural recreation area is significant. Recreation use is estimated to be 332,500 visitor days annually. With initial basic recreation facilities installed at the Alpine reservoir to accommodate general recreation users, it is estimated that annual attendance would total 330,500 visitor days. This represents a loss of 2,000 visitor days of recreation use with construction of the project.

The Bureau of Sport Fisheries and Wildlife have expressed concern over loss of big game habitat. Elk utilize the river bottoms at various locations in the impoundment area as winter range.

The State of Wyoming's South Park Feed Grounds is located in the vicinity of Dog Creek and would be flooded. Approximately 3,000 to 4,000 elk are fed there each winter. Elk and deer have migration routes with crossings throughout most of the reservoir area. The Fish and Wildlife Service estimates an annual loss of 16,100 big game hunting activity days if the Alpine dam is constructed.

No known archeological or historical surveys of reservoir area have been made. Such surveys should be accomplished if the project is authorized.

The State of Wyoming, on February 11, 1959, approved a Joint Memorial in opposition to the Snake Narrows reservoir (Alpine). This Memorial, No. 5, states the following: "A joint memorial, memorializing the Congress of the United States of America with reference to the opposition of the people of the State of Wyoming to the construction of the Snake River Narrows Reservoir in the State of Wyoming."

The Wyoming Game and Fish Commission, Bureau of Sport Fisheries and Wildlife, U.S. Forest Service, and the National Park Service are all

firmly opposed to any reservoir being constructed along this section of the Snake River.

Recreation Development

To accommodate the visiting public, provide for the initial enjoyment and safety, and to protect the project, the following facilities should be provided: surfaced interior roads, parking areas, picnic and campsite facilities, drinking water and sanitary facilities, and boating facilities such as launching ramps and docks. Installation of these basic recreation facilities for recreation use at Bureau of Reclamation reservoirs is considered to be a non-reimbursable Federal responsibility when administered by a Federal agency.

Estimated Monetary Benefits

The following estimated annual monetary benefits accruing from the Federally developed recreation facilities for the Alpine Unit follow guidelines established by the interdepartmental statement of "Evaluation Standards for Primary Outdoor Recreation Benefits", Supplement No. 1, Senate Document No. 97, dated June 4, 1964. General project recreation use includes such activities as picnicking, sightseeing, camping, swimming and boating. Estimates do not include benefits attributed to hunting or fishing.

Recreation use and related benefits are estimated as follows:

Initial Development

Existing use without project	332,500 visitor days
Initial use with project	<u>330,500</u> visitor days
Loss	2,000 visitor days

Benefits

Existing use without project	\$1.40	\$465,500
Initial use with project	\$1.00	<u>330,500</u>
Loss		\$135,000

Optimum Development

Existing use projection without project	660,500 visitor days
Ultimate use projection with project	<u>650,000</u> visitor days
Loss	10,500 visitor days

Benefits

Projection without project	\$1.40	\$924,700
Ultimate use projection with project	\$1.00	<u>650,000</u>
Loss		\$274,700

In unit values selected for the general recreation use, adjustments reflect quality consideration of the proposed reservoir and its draw-down, suitability of recreation sites, and esthetics relative to existing conditions.

Upstream benefits have been estimated on the basis that all of the replacement needs or alternate storage requirements for Jackson Lake stabilization would be provided for by the Alpine reservoir proposal through transfer of the source of irrigation water supply.

Jackson Lake benefits are estimated as follows:

<u>Replacement Storage Acre-Feet</u>	<u>Upstream Benefits</u>		
	<u>Initial</u>	<u>1972</u>	<u>Ultimate</u>
640,000	\$1,183,000	\$1,686,200	\$2,350,800













Conclusions and Recommendations

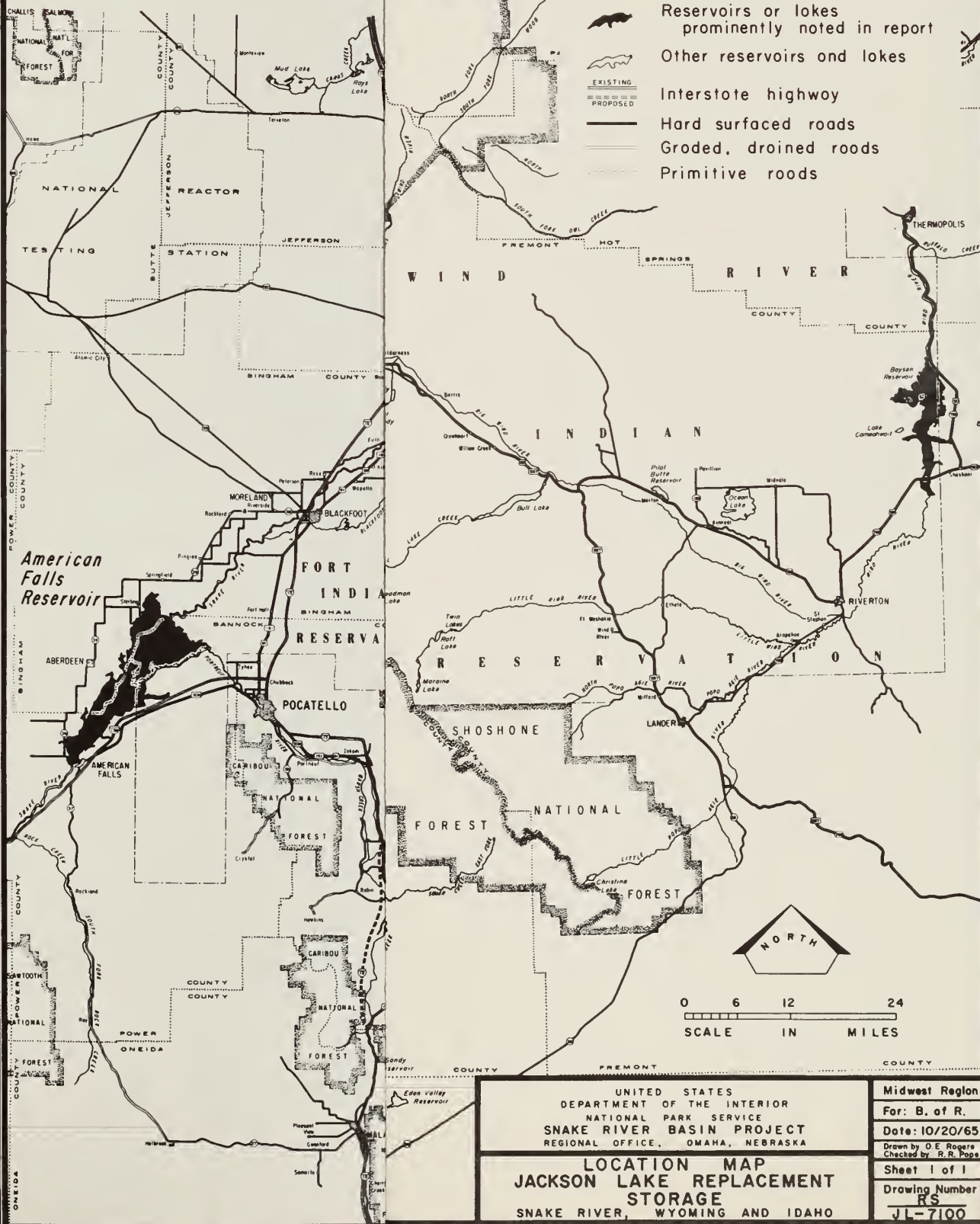
The Alpine reservoir proposal would not have a direct impact on any area administered by the National Park Service or any designated wilderness area. However, it would have extreme adverse effects upon nationally important wildlife, fishing and recreation values present in this portion of the Snake River. This free-flowing stretch of the Snake River is and will continue to be more valuable for recreation than a highly fluctuating reservoir. The existing adjacent Palisades reservoir and the proposed Lynn Crandall reservoir and other nearby bodies of water, will provide reservoir-associated recreation activities sufficient to meet visitor demands in the foreseeable future.

Although the Alpine reservoir could provide alternate water storage requirements necessary to stabilize Jackson Lake, it is strongly recommended that this project not be given further consideration for that purpose. It would be extremely unfortunate if such an outstanding natural recreation area as exists in the canyon were replaced by a man-made fluctuating reservoir similar to the many other impoundments on the Snake River.

BASIC DATA FROM NPS PLAN RS/FON-7100A, 10/58; HIGHWAY MAPS OF IDAHO AND WYOMING, 1965, G.S. SHEETS 1:250,000 SCALE—ORIGGS, 1962; ASHTON, 1960; IDAHO FALLS, 1963; COOY, 1962; THERMOPOLIS, 1958, LANDER, 1961; PRESTON, 1962, POCA TELLO, 1963

LEGEND













-  Proposed dam sites
-  National Park Service areas
-  National Forest areas
-  Federal agency boundaries
-  State line
-  County lines
-  Reservoirs or lakes prominently noted in report
-  Other reservoirs and lakes
-  Interstate highway
-  Hard surfaced roads
-  Graded, drained roads
-  Primitive roads

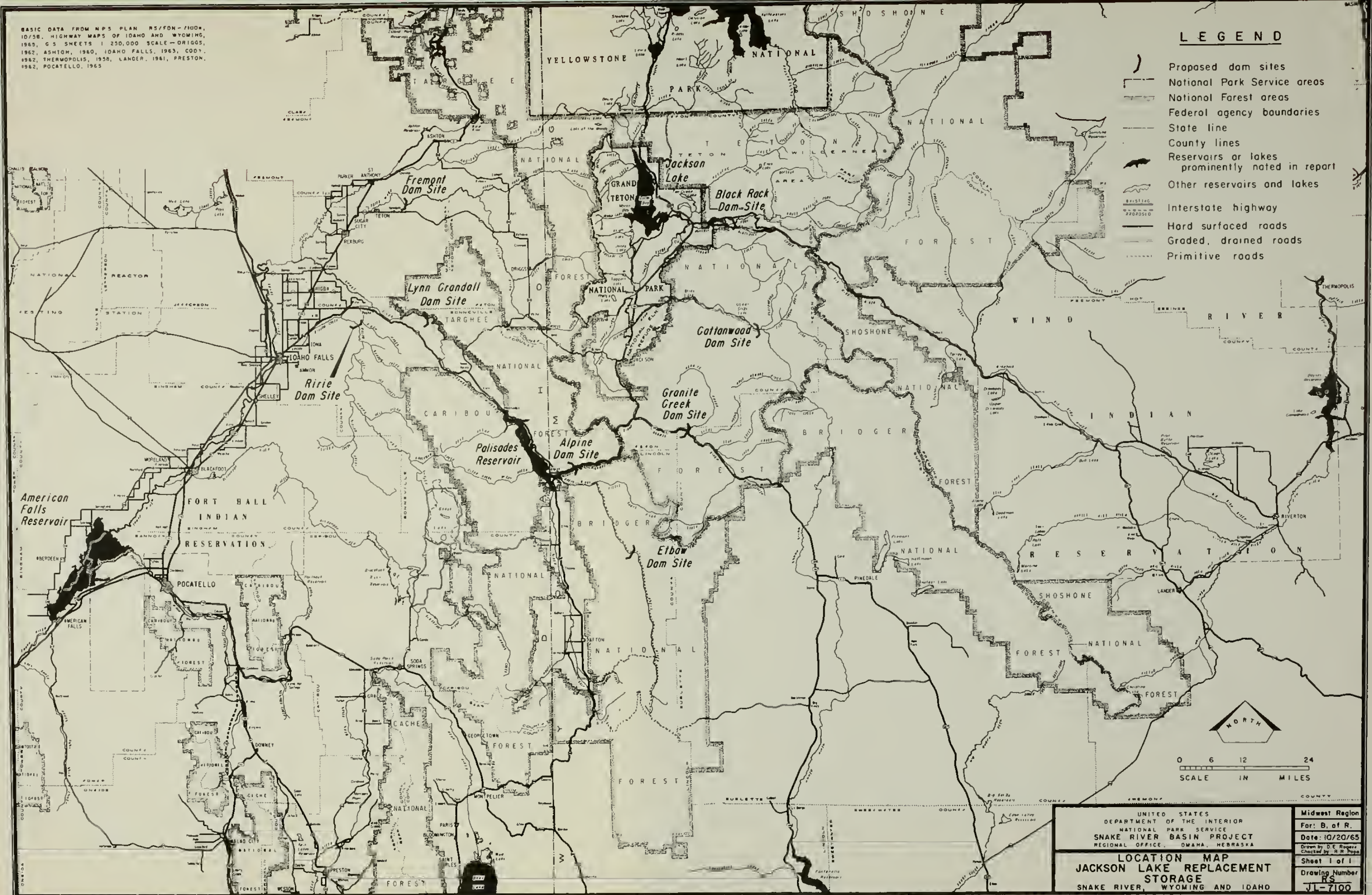


UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE SNAKE RIVER BASIN PROJECT REGIONAL OFFICE, OMAHA, NEBRASKA LOCATION MAP JACKSON LAKE REPLACEMENT STORAGE SNAKE RIVER, WYOMING AND IDAHO	Midwest Region
	For: B. of R.
	Date: 10/20/65
	Drawn by O.E. Rogers Checked by R.R. Pope
	Sheet 1 of 1
Drawing Number RS	JL-7100

BASIC DATA FROM NPS PLAN R5/FON-1100
10/58. HIGHWAY MAPS OF IDAHO AND WYOMING
1969, G 5 SHEETS 1 250,000 SCALE-ORIGAS
1962, ASHTON, 1960, IDAHO FALLS. 1963, COO?
1962, THERMOPOLIS, 1958, LANDER. 1981, PRESTON
1982, POCATELLO. 1963

L E G E N D

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UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
SNAKE RIVER BASIN PROJECT
REGIONAL OFFICE, OMAHA, NEBRASKA

LOCATION MAP
JACKSON LAKE REPLACEMENT
STORAGE
SNAKE RIVER, WYOMING AND IDAHO

Midwest Region

For: B. of R.

Date: 10/20/65

Drawn by D. E. Rogers
Checked by A. R. Papp

Sheet 1 of 1

Drawing Number

RS
II = 3100

